Medical matters – Data analysis

Supplementary material:

Acute respiratory response to traffic-related air pollution during physical activity performance

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Content

1) Correction factor, spatio-temporal estimates and post-exposure monitoring

Correction factor

Particle counts from the optical particle counter (CPC, Model 3007, TSI, Minnesota, USA) above 100 000 particles/cm^3 were corrected to prevent particle count underestimation using the equation cpc_corr = 38457 x (exp(cpc x 0.00001)) (Westerdahl et al. 2005).

Spatio-temporal pre-exposure estimates

Daily variable values from regional air pollution monitoring stations of 2011 were used to temporally-adjust a spatial model created in 2007 for the ESCAPE project (Cyrys et al. 2012; De Nazelle et al. 2013; Eeftens et al. 2012; Nieuwenhuijsen et al. 2015). The ratio of 2011 and 2007 annual means allowed an adjusted update of the 2007 spatial model.

The following LUR-estimates were available for participant home addresses: NO_2, NO_x, $PM_{2.5}$, PM_{10} and PM_{coarse} (see part 4, Figure S2). From these, the NO_2 estimate was chosen as a residential pre-exposure covariate in order to minimize the potential risk for multicolinearity in our models. From all available pre-exposure estimates the NO_2 estimate showed the weakest correlation with exposure estimates on study days and in addition a high correlation with other residential pre-exposure estimates (see part 4, Figure S2). Furthermore, assuming that people were indoors at home during the night, we also expected gaseous constituents of air pollution to be more relevant than its particulate constituents (Koutrakis et al. 1991). Above all, substituting the NO_2 covariate in our models with another residential pre-exposure estimate (e.g. PM_{coarse}) did not change model outcomes substantially (results are not shown).

Post-exposure monitoring

Table S0 summarizes the data gathered during the free-living period collected via the Cambridge Personal Environmental Monitor (PEM) and the ambulatory electrocardiography monitor, respectively. The average heart rate (HR) of participants during their free living period is between the average HR measured during the Rest and Physical activity (PA)-Scenario, whereas the average NO-exposure during the free-living period is lower than the average exposure at the Low Traffic (LT) site during the exposure period (compare Table S0 & manuscript, Table 1&2).

Table S0: Post-exposure monitoring during the free-living period

	All		Male		Female	
HR monitoring	**mean**	**(min-max)**	**mean**	**(min-max)**	**mean**	**(min-max)**
HR (%HR_{max})	46.8	(33.7-55.2)	44.2	(33.7-53.0)	49.7	(43.0-55.2)
Air quality monitoring	**Int.**	**(95% CI)**	**Int.**	**(95% CI)**	**Int.**	**(95% CI)**
NO (ppm)	45.1	(39.4, 50.9)	46.5	(38.2, 54.8)	43.9	(35.4, 52.3)
NO_2 (ppm)	13.6	(12.4, 14.8)	13.7	(11.8, 15.5)	13.5	(12, 15.1)
CO (ppm)	0.81	(0.73, 0.89)	0.84	(0.72, 0.95)	0.78	(0.66, 0.91)

HR, Heart rate; Int., Intercept; 95% CI, Approximated 95% confidence interval for mixed-effects models.

To examine the influence of the physical activity level during the free-living period on model outcomes, the post-exposure (free-living) estimate for HR was added as covariate to the models to test stability of the observed associations, with a focus on those observed for the second post-exposure time point and using the pooled models. However, substantial changes in model outcomes were not observed (see part 10).

2) Detailed specification of mixed effect models

Table S1 shows the syntax of mixed effects models used to examine associations and interactions between respiratory measures, physical activity (PA), traffic related air pollution (TRAP) exposure and TRAP pre-exposure.

Table S1: Mixed effects models specification

Model	Description and syntax	Data
B1	**Cycle-specific baseline model** fixed=~ 1 + Cycle , random=~1|ID	T_0
B2	**Turn-specific baseline model** fixed=~ 1 + Turn , random=~1|ID	T_0
CA1	**Exposure model adjusting for PA- and Exposure-status** fixed=~ 1 + EX + PA + pre.exp+ T + RH + Sex + Age, random=~1 | ID/ Y_0	T_1, T_2, T_1 and T_2 pooled*
CA2	**Exposure model using a categorical covariate for Scenario** fixed=~ 1 + Scenario + pre.exp+ T + RH + Sex + Age, random=~1 | ID/ Y_0	T_1, T_2, T_1 and T_2 pooled*
CO1	**Single pollutant model using continous covariates for PA and pollutant exposure** fixed=~ 1 + exp + pa + pre.exp+ T + RH + Sex + Age, random=~1 | ID/ Y_0	T_1, T_2, T_1 and T_2 pooled*
IA1**	**PA Exposure interaction model** fixed=~ 1 + exp x pa + pre.exp+ T + RH + Sex + Age, random=~1 | ID/ Y_0	T_1, T_2, T_1 and T_2 pooled*
IA2**	**PA Pre-exposure interaction model** fixed=~ 1 + exp + pa x pre.exp+ T + RH + Sex + Age, random=~1 | ID/ Y_0	T_1, T_2, T_1 and T_2 pooled*
IA3**	**Pre-exposure exposure interaction model** fixed=~ 1 + pa + exp x pre.exp + T + RH + Sex + Age, random=~1 | ID/ Y_0	T_1, T_2, T_1 and T_2 pooled*

Abreviations: Age, age of subject (discrete variable), exp, exposure level for singel pollutant (continous varibale); EX, exposure state (binary variable); ID, subject identification (categorical varibale); pa, continous variable for physical activity; PA, physical activity status (dummy variable); pre.exp, adress-modeld NO_2 pre-exposure covariate for participants' exposure one day prior to study days; RH, relative humidity (continous variable); Sex, specifies sex of subject (binary varibale); Scenario, categorical variable for scenario; T, mean temperature (continous variable); Y_0, baseline measure of respiratory outcome (continous variable). **Comments:** *If pooled data was used a categorical variable for time category (TC) was added to the fixed effects term and a by-subject adjustment for TC to the random term (random=~1+TC | ID/ Y_0). **In interaction models either continous or categorical variables for PA and Exposure were used.

3) Baseline analysis

A repeated measures ANOVA with a Tukey multiple comparison follow-up tests was performed to evaluate if there are differences in mean baseline values across scenarios and turns, respectively. To conduct this analysis the glht function of the multcomp package in R was utilized (Bretz et al. 2015; Hothorn et al. 2008). The Bonferroni method was used in multiple comparisons for the adjustment of p-values. Statistically significant differences are neither observed when means are compared by scenario nor when compared by turn (Table S2 & S3). Each participant took part on four turns, each turn being randomly assigned to one of the four scenarios.

Table S2: Mixed effect analysis (model B1) and multiple comparision of baseline measurements with scenario "Rest + HT " as reference

	FEV_1			FEV_1/FVC-			PEF			FVC			$FEF_{25-75\%}$		
FE Estimate	**Coef.**	**SE**	**p**	**Coef.**	**SE**	**p**	**Coef.**	**SE**	**p**	**Coef.**	**SE**	**p**	**Coef.**	**SE**	**p**
S1 (R+HT)	3642.0	176.3	0.00	79.45	1.14	0.00	537.8	26.2	0.00	4593.5	214.1	0.00	3470.9	229.8	0.00
S2 (R+LT)	28.2	26.5	0.29	0.62	0.34	0.07	9.1	7.8	0.25	-4.3	31.9	0.89	116.8	76.5	0.13
S3 (PA+HT)	40.5	26.1	0.12	0.57	0.34	0.09	9.5	7.7	0.22	20.7	31.5	0.51	141.4	75.7	0.07
S4 (PA+LT)	-19.4	26.1	0.46	0.23	0.34	0.49	-0.6	7.7	0.94	-45.8	31.5	0.15	-20.5	75.7	0.79

Multiple comparisons of scenario-specific baseline estimates

Linear	FEV_1			FEV_1/FVC-			PEF			FVC			$FEF_{25-75\%}$		
Hypotheses	**Est.**	**SE**	**p**	**Est.**	**SE**	**p**	**Est.**	**SE**	**p**	**Est.**	**SE**	**p**	**Est.**	**SE**	**p**
2 - 1 == 0	28.2	26.5	1.00	0.62	0.34	0.40	9.09	7.81	1.00	-4.33	31.90	1.00	116.81	76.55	0.76
3 - 1 == 0	40.5	26.1	0.73	0.57	0.34	0.53	9.54	7.72	1.00	20.69	31.53	1.00	141.38	75.66	0.37
4 - 1 == 0	-19.4	26.1	1.00	0.23	0.34	1.00	-0.56	7.72	1.00	-45.78	31.53	0.88	-20.45	75.66	1.00
3 - 2 == 0	12.3	26.5	1.00	-0.05	0.34	1.00	0.45	7.81	1.00	25.02	31.90	1.00	24.57	76.55	1.00
4 - 2 == 0	-47.6	26.5	0.43	-0.39	0.34	1.00	-9.65	7.81	1.00	-41.45	31.90	1.00	-137.26	76.55	0.44
4 - 3 == 0	-59.9	26.1	0.13	-0.34	0.34	1.00	-10.10	7.72	1.00	-66.47	31.53	0.21	-161.83	75.66	0.19

FE, Fixed effect; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV_1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; HT, High traffic site; LT, Low traffic site ;PA, Physical activity; PEF, Peak expiratory flowp; p-value; R, Rest ; S1-S4, Scenario 1-4; SE, Standard Error.

Table S3: Mixed effect analysis (model B2) and multiple comparision of baseline measurements with first turn as reference

	FEV_1			FEV_1/FVC-			PEF			FVC			$FEF_{25-75\%}$		
FE Estimate	**Coef.**	**SE**	**p**	**Coef.**	**SE**	**p**	**Coef.**	**SE**	**p**	**Coef.**	**SE**	**p**	**Coef.**	**SE**	**p**
Turn 1	3665.2	176.4	0.00	80.14	1.14	0.00	541.6	26.2	0.00	4580.8	214.2	0.00	3640.1	230.1	0.00
Turn 2	-20.0	27.0	0.46	-0.53	0.34	0.12	-1.8	7.8	0.82	17.3	32.3	0.59	-153.6	76.1	0.05
Turn 3	-13.0	27.0	0.63	-0.26	0.34	0.44	5.7	7.8	0.47	-4.1	32.3	0.90	-131.1	76.1	0.09
Turn 4	-11.4	27.4	0.68	-0.57	0.34	0.10	-1.2	7.9	0.88	8.2	32.7	0.80	-159.3	77.0	0.04

Multiple comparisons of turn-specific baseline estimates

Linear	FEV_1			FEV_1/FVC-			PEF			FVC			$FEF_{25-75\%}$		
Hypotheses	**Est.**	**SE**	**p**	**Est.**	**SE**	**p**	**Est.**	**SE**	**p**	**Est.**	**SE**	**p**	**Est.**	**SE**	**p**
2 - 1 == 0	-20.02	27.04	1.00	-0.53	0.34	0.71	-1.77	7.80	1.00	17.33	32.30	1.00	-153.58	76.11	0.26
3 - 1 == 0	-13.00	27.04	1.00	-0.26	0.34	1.00	5.73	7.80	1.00	-4.12	32.30	1.00	-131.12	76.11	0.51
4 - 1 == 0	-11.35	27.36	1.00	-0.57	0.34	0.55	-1.21	7.89	1.00	8.24	32.69	1.00	-159.29	77.01	0.23
3 - 2 == 0	7.03	27.04	1.00	0.26	0.34	1.00	7.50	7.80	1.00	-21.44	32.30	1.00	22.46	76.11	1.00
4 - 2 == 0	8.67	27.36	1.00	-0.05	0.34	1.00	0.57	7.89	1.00	-9.09	32.69	1.00	-5.71	77.01	1.00
4 - 3 == 0	1.64	27.36	1.00	-0.31	0.34	1.00	-6.93	7.89	1.00	12.36	32.69	1.00	-28.17	77.01	1.00

FE, Fixed effect; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV_1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; HT, High traffic site exposure; LT, Low traffic site ; PEF, Peak expiratory flowp; p-value;; R, Rest ; S1-S4, Scenario1-4; SE, Standard Error.

4) Correlation analysis of air pollution components

Figure S1 shows the correlation among measured components of TRAP, whereas Figure S2 shows correlations among TRAP pre-exposure estimates and between TRAP pre-exposure estimates and TRAP exposure estimates, respectively.

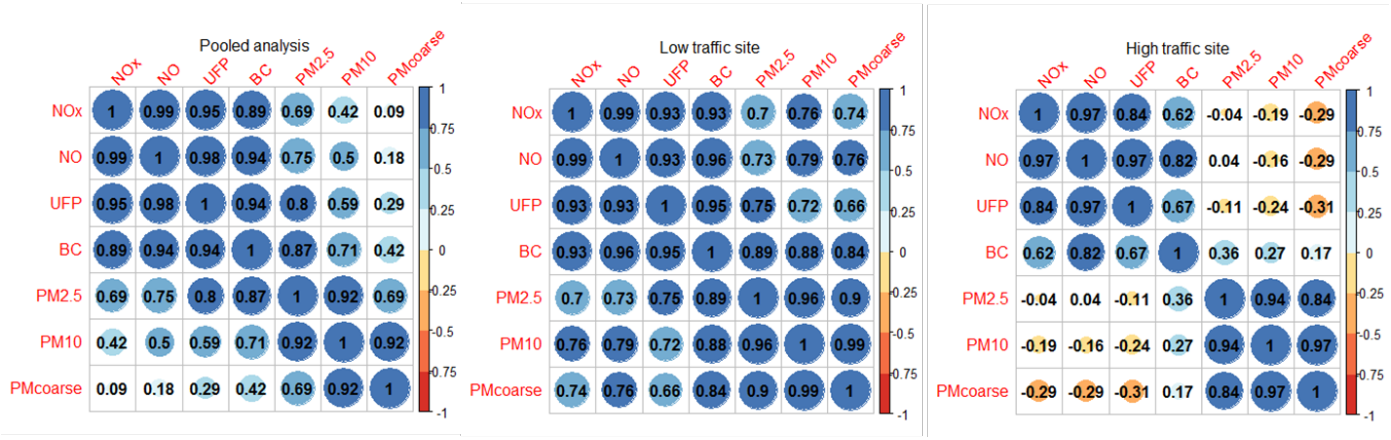

Figure S1: Correlation matrices for single pollutant measures pooled across sites and stratified by low traffic (LT) and high traffic site (HT), respectively. Matrices show pearson's correlation coefficients and the area and color of the circles visualize the corresponding coefficients graphically.

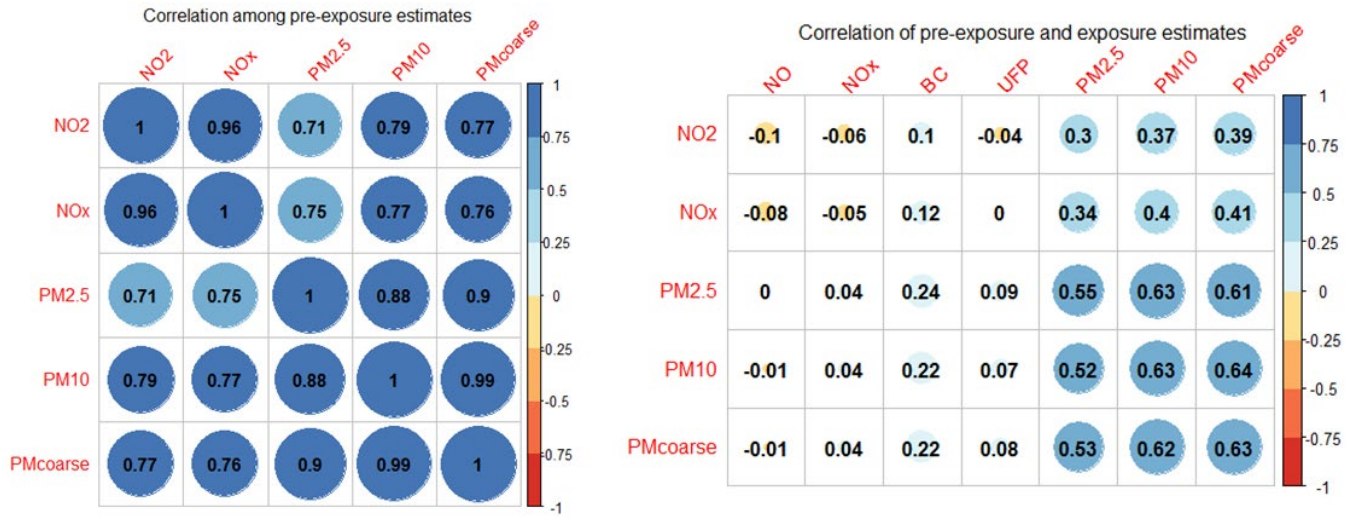

Figure S2: Correlation among residential pre-exposure estimates and between these estimates and study day exposure estimates, respectively. Pre-exposure estimates are for participant home addresses one day prior to study days. Numbers in the matrices show pearson's correlation coefficients and the area and color of the circles visualize the corresponding coefficients graphically.

5) Stratified analysis by sex

For a follow up analysis, examining sex-specific differences relative changes in respiratory outcomes were analyzed scenario-specific. Boxplots were generated for the immediate post-exposure time point (T_1) (Figure S3) and for the relative change in respiratory measures between first and second post-exposure time point (T_2) (Figure S4).

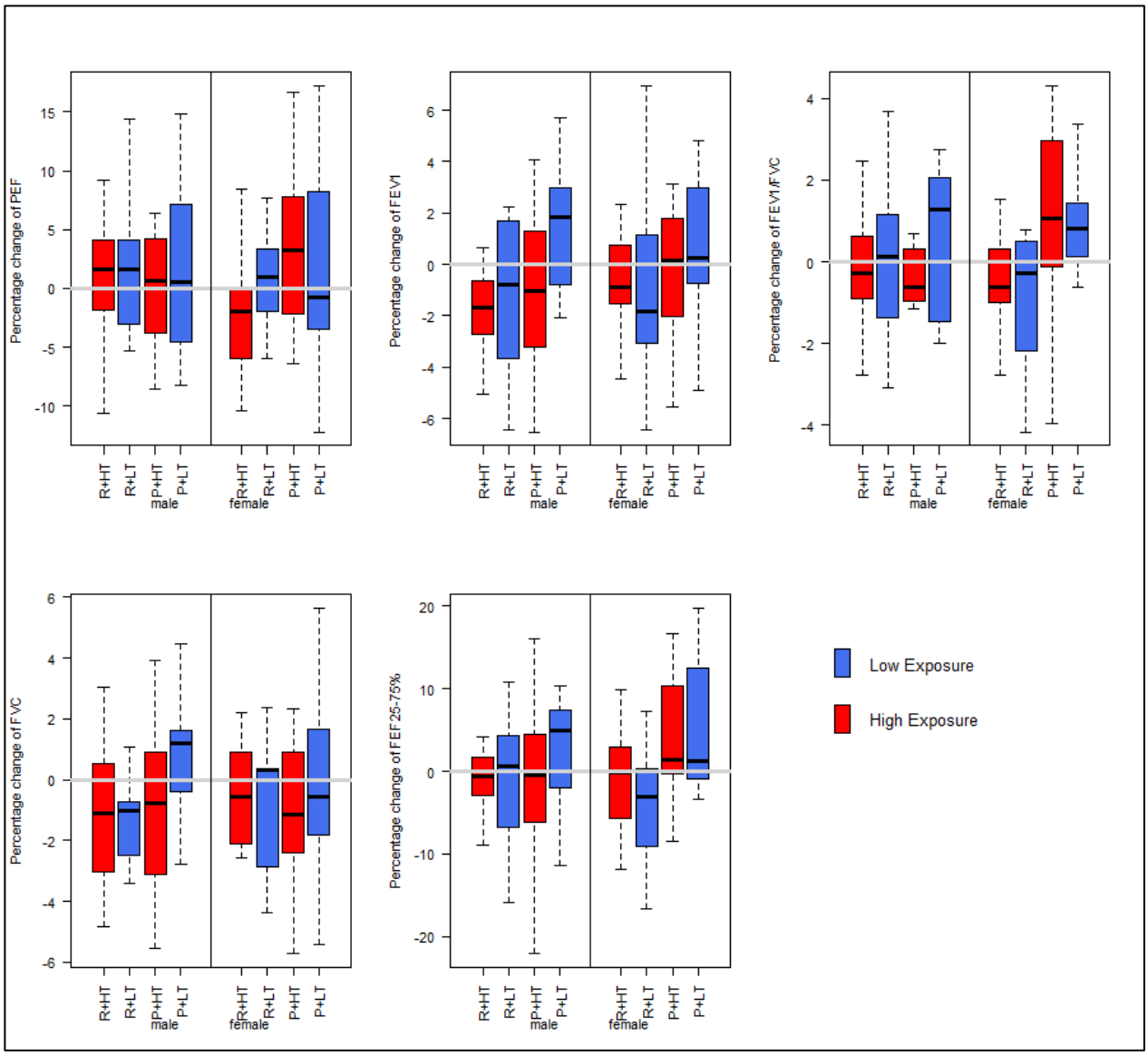

Figure S3: Scenario-specific relative changes in respiratory outcomes immediately after exposure grouped by sex. Horizontal lines in each box show median values and boxes span the 25th (Q1) and 75th (Q3) percentiles. The upper whisker extends further until the smaller of the both values max(x) and Q3 + 1.5 * IQR. The lower whisker accordingly extends further until the greater of the both values min(x), Q1 - 1.5 * IQR. Values lying outside of this range are not shown in the plots. Abbreviations: LT, Low traffic site (blue boxes); HT, High traffic site (red boxes); R, Rest; P, Physical activity.

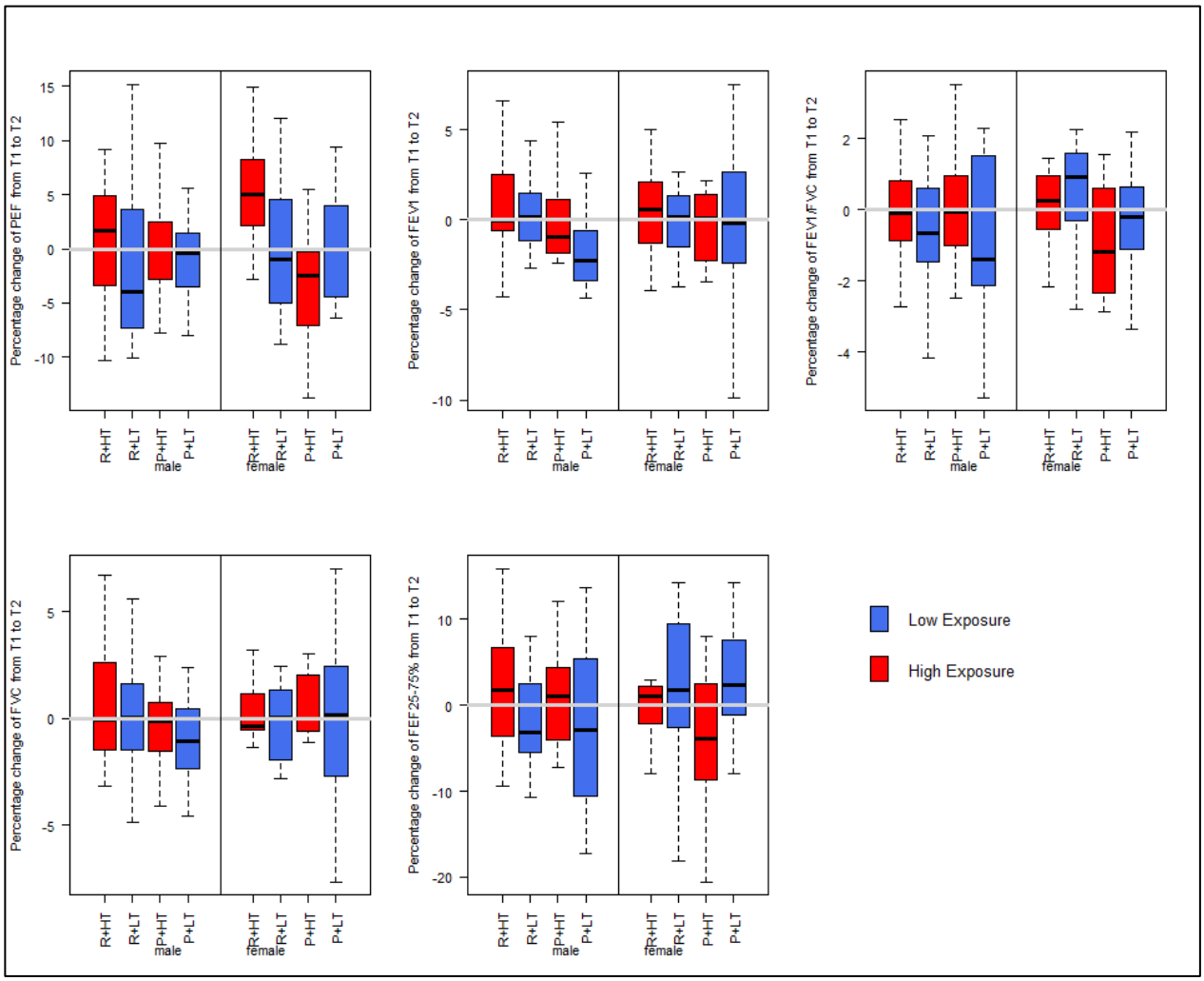

Figure S4: Scenario-specific percentage change between the first and the second post-exposure time point grouped by sex. The upper whisker extends further until the smaller of the both values max(x) and Q3 + 1.5 * IQR. The lower whisker accordingly extends further until the greater of the both values min(x), Q1 - 1.5 * IQR. Values lying outside of this range are not shown in the plots. Abbreviations: LT, Low traffic site (blue boxes); HT, High traffic site (red boxes); R, Rest; P, Physical activity.

6) Subject specific analyses

Standardized measures of variability are shown subject-specific for baseline measurements of female and male participants in Table S4 and S5, respectively. Participants excluded in the sensitivity analysis are highlighted in blue. They were primarily selected based on their high variability in baseline measurements. ID 70 was also selected because of its untypical high amount of outliers in the outlier analysis (see Part 7)

Table S4: Variability of baseline measurements fullfilling within-maneuver acceptability criteria (female participants)

Subject data				Respiratory outcomes													
				FEV_1 (mL)				FVC (mL)				$FEF_{25-75\%}$ (mL/s)				PEF (L/min)			
ID	Sex	Age	BMI	mean	SD	CV	IQR	mean	SD	CV	IQR	mean	SD	CV	IQR	mean	SD	CV	IQR
42	f	20	22	2855	88	3.1	88	3639	72	2.0	71	2455	189	7.7	172	441.0	37.0	8.4	37
43	f	41	28	2977	59	2.0	46	3662	49	1.3	59	3164	187	5.9	188	586.5	21.0	3.6	13
45	f	25	23	4321	80	1.9	92	5137	105	2.0	138	4628	111	2.4	133	479.0	11.9	2.5	10
48	f	37	23	2642	53	2.0	36	3706	58	1.6	76	1781	100	5.6	68	483.6	15.0	3.1	10
50*	f	37	18	2693	295	11.0	470	3154	293	9.3	383	2909	535	18.4	755	528.9	57.5	10.9	63
51	f	35	25	2435	44	1.8	30	2869	69	2.4	67	3151	260	8.3	373	358.3	16.3	4.5	11
52	f	19	23	2707	89	3.3	115	2864	77	2.7	93	3845	253	6.6	335	385.6	11.2	2.9	10
53**	f	44	23	2529	104	4.1	71	3519	178	5.1	144	1777	113	6.3	95	360.9	28.2	7.8	26
54	f	40	21	2879	64	2.2	47	3784	71	1.9	65	2310	113	4.9	64	452.3	12.2	2.7	12
55	f	27	20	3456	48	1.4	30	3831	21	0.5	27	4437	220	5.0	133	403.9	19.4	4.8	14
58	f	52	30	2358	58	2.5	40	2963	52	1.8	61	2425	190	7.8	153	356.2	44.7	12.5	71
61	f	54	20	2732	27	1.0	24	3628	84	2.3	90	2157	162	7.5	124	424.1	21.2	5.0	25
64	f	54	25	3038	90	3.0	65	3977	73	1.8	38	2742	169	6.2	143	333.0	12.5	3.7	13
66	f	28	23	2974	73	2.4	44	3877	60	1.6	33	2521	124	4.9	69	408.3	9.1	2.2	8
70**	f	46	39	2516	72	2.9	113	3000	85	2.8	71	3124	264	8.5	190	451.3	12.3	2.7	17

BMI, Body mass index; CV, Coefficient of variation; f, female; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced viatal capacity; IQR, Interquantile range; PEF, Peak expiratory flow; SD, Standard deviation. *ID 50 was excluded from the study data. **Participants excluded in the sensitivity analysis, since considered to be potentially influential.

Table S5: Variability of baseline measurements fullfilling within-maneuver acceptability criteria (male participants)

Subject data				Respiratory outcomes													
				FEV_1 (mL)				FVC (mL)				$FEF_{25-75\%}$ (mL/s)				PEF (L/min)			
ID	Sex	Age	BMI	mean	SD	CV	IQR	mean	SD	CV	IQR	mean	SD	CV	IQR	mean	SD	CV	IQR
41	m	27	22	4447	146	3.3	112	5113	78	1.5	54	5573	372	6.7	398	621.2	34.1	5.5	29
44	m	27	22	4383	133	3.0	103	5358	146	2.7	125	4560	728	16.0	481	564.1	43.4	7.7	32
47	m	38	23	3546	71	2.0	97	4948	95	1.9	72	2320	72	3.1	62	685.0	27.2	4.0	34
49	m	35	24	5344	39	0.7	31	6220	56	0.9	62	5812	175	3.0	157	776.7	18.4	2.4	18
56	m	29	24	3493	70	2.0	79	4575	111	2.4	121	2921	81	2.8	104	473.2	16.3	3.4	12
57	m	39	23	3331	59	1.8	49	4516	80	1.8	62	2458	130	5.3	127	629.4	30.9	4.9	26
59	m	24	26	4355	43	1.0	64	5165	41	0.8	30	4438	187	4.2	261	694.2	13.9	2.0	19
60	m	35	23	4358	80	1.8	61	5693	128	2.3	125	3698	105	2.8	140	607.8	60.0	9.9	45
62	m	32	28	4889	157	3.2	150	6085	63	1.0	36	4457	338	7.6	367	660.0	19.2	2.9	26
63**	m	57	24	4072	195	4.8	192	6027	364	6.0	226	2288	114	5.0	112	666.2	16.8	2.5	19
65**	m	20	24	4156	123	3.0	112	5213	171	3.3	197	3698	113	3.1	67	621.3	56.4	9.1	42
67**	m	28	25	4905	177	3.6	159	5897	258	4.4	290	5203	263	5.0	437	637.8	36.4	5.7	25
68	m	24	25	5634	31	0.6	44	6968	52	0.7	72	5428	180	3.3	134	807.4	23.8	2.9	15
69**	m	57	26	4130	212	5.1	314	5002	107	2.1	107	4747	803	16.9	1095	614.7	29.2	4.8	27
71	m	50	27	4507	100	2.2	67	5761	67	1.2	100	4237	602	14.2	672	742.5	52.9	7.1	36

BMI, Body mass index; CV, Coefficient of variation; f, female; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced viatal capacity; IQR, Interquantile range; PEF, Peak expiratory flow; SD, Standard deviation. **Participants excluded in the sensitivity analysis, since considered to be potentially influential.

One female participant was excluded from the study data, since we wanted to restrict our study to healthy participants. The participant with ID 50 reported signs of a reversible obstruction during the study and a clinical analysis of its spirometry data indicated an abnormal lung function. ID50 showed the greatest variability in baseline measurements, as

well as measurements taken immediately and 7 hours after exposure (see Figure S1-S5). Upon exposure ID 50 responded with an increase of FEV_1 of greater than 21% (> 500 mL) and FVC of greater than 18% (>500 mL) (see Table S4). This high and irregular variation in respiratory measure can rather be attributed to a temporary suspension of the reversible airflow obstruction, than to the actual effects of exposure. Furthermore, based on standardized measures of variability, ID 50 shows the highest variability in baseline measurements fulfilling within-maneuver acceptability criteria among female participants (see Table S5). According to the ATS/ERS criteria an improvement of FEV_1 and/or FVC upon a bronchodilatory stimulus of greater than 12% and an absolute improvement of more than 200 mL is considered as an evidence of a reversible obstruction. Normal subjects show an improvement of FEV_1 and/or FVC of not more than 8% upon a bronchodilatory stimulus. (Johns and Pierce 2008; Miller et al. 2005; Pellegrino 2005)

Table S6: Relative and absolute change of respiratory measures from baseline to T1/T2 of participant ID 50

Study details			FEV1		FVC		$FEF_{25-75\%}$		PEF	
Scenario	Turn	TP	mL	%	mL	%	mL/s	%	L/min	%
R + LT	1	T1	11	0.4	114	3.5	-249	-7	30	5.5
R + LT	1	T2	34	1.2	92	2.8	-53	-1.5	77	14.2
PA + LT	2	T1	-344	-11.6	-309	-8.8	-422	-13.5	-58	-9.6
PA + LT	2	T2	-193	-6.5	-162	-4.6	-248	-7.9	-12	-2
PA + HT	3	T1	221	8.9	309	10.3	86	3.4	78	15.7
PA + HT	3	T2	185	7.5	276	9.3	101	4	55	11.1
R + HT	4	T1	389	16.2	431	15.1	580	23.6	110	23.2
R + HT	4	T2	517	21.6	532	18.7	859	35	107	22.7

$FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; HT, High traffic site; LT, Low traffic site; PEF, Peak expiratory flow; T1, Imediate after exposure time point; T2, Seven hours after exposure time point; TP, Post-exposure time point.

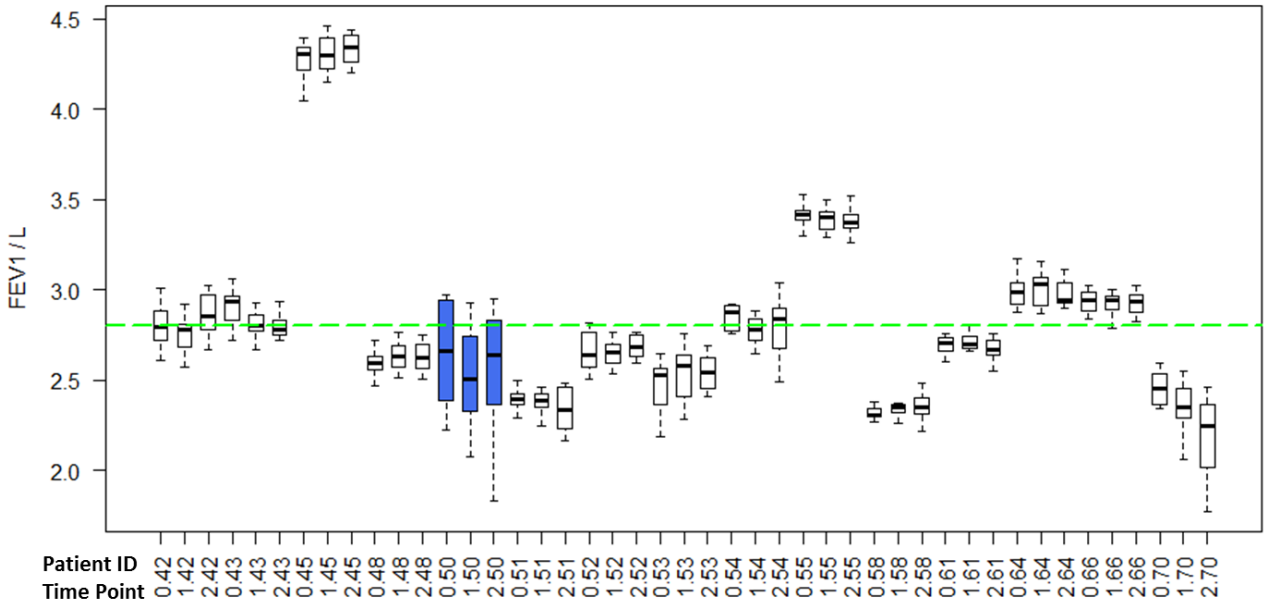

Figure S5: Boxplot of FEV_1 for female participants based on all measurements fulfilling within-maneuver criteria, grouped by time point (0=baseline, 1=immediate post-exposure, 2=Seven hours after exposure) and subject ID. Green dashed line = mean FVC.

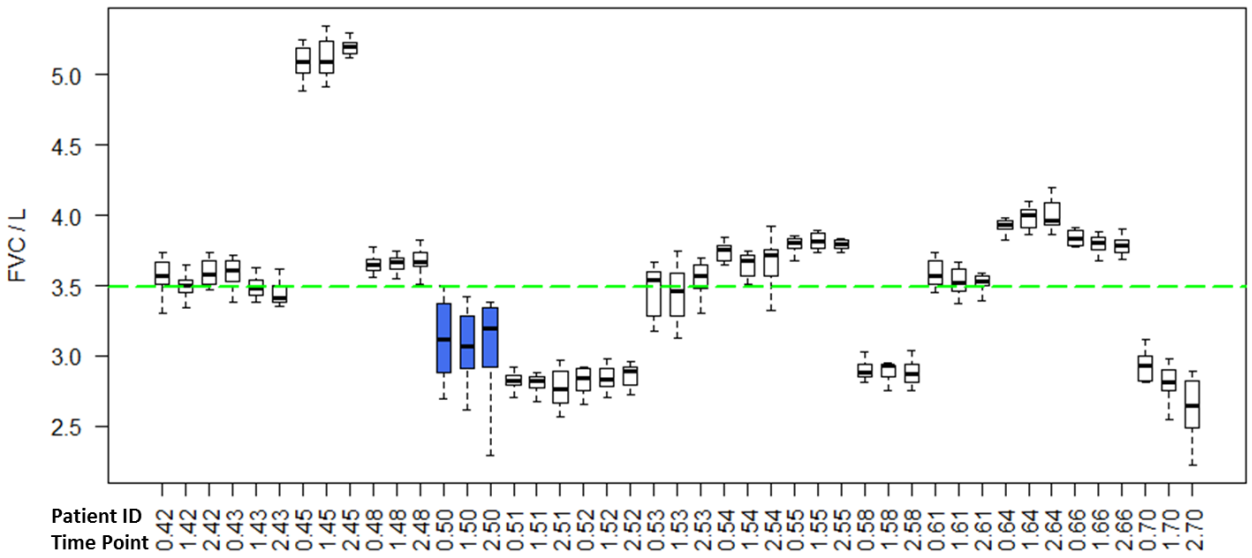

Figure S6: Boxplot of FVC for female participants based on all measurements fulfilling within-maneuver criteria, grouped by time point (0=baseline, 1=immediate post-exposure, 2=Seven hours after exposure) and subject ID. Green dashed line = mean FVC.

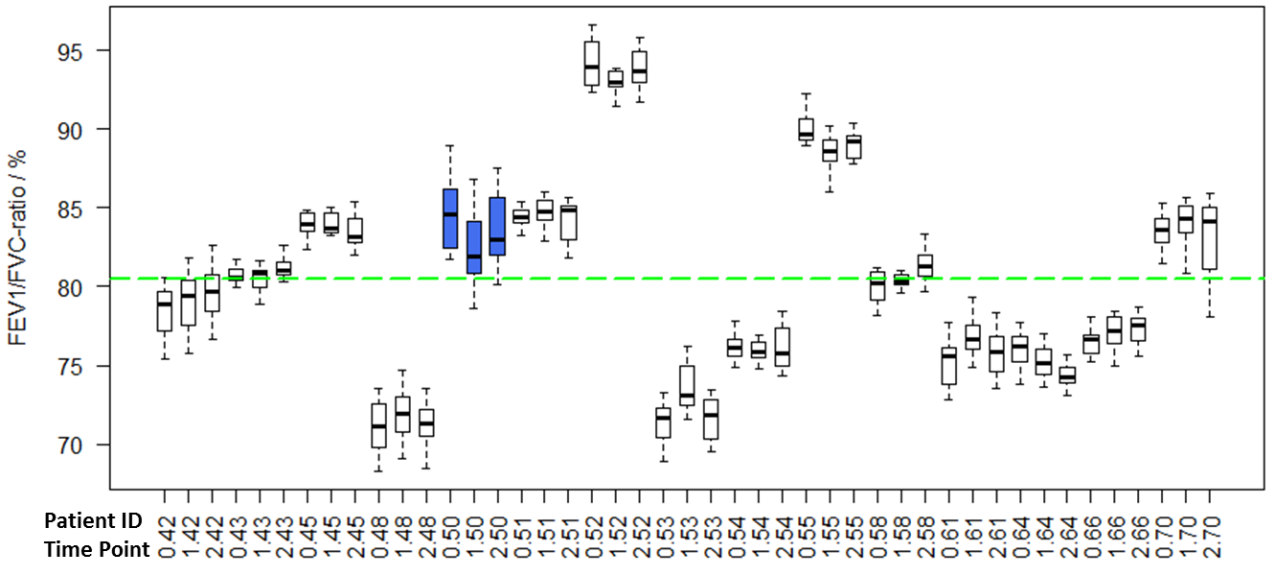

Figure S7: Boxplot of FEV_1/FVC for female participants based on all measurements fulfilling within-maneuver criteria, grouped by time point (0=baseline, 1=immediate post-exposure, 2=Seven hours after exposure) and subject ID. Green dashed line = mean FEV_1/FVC.

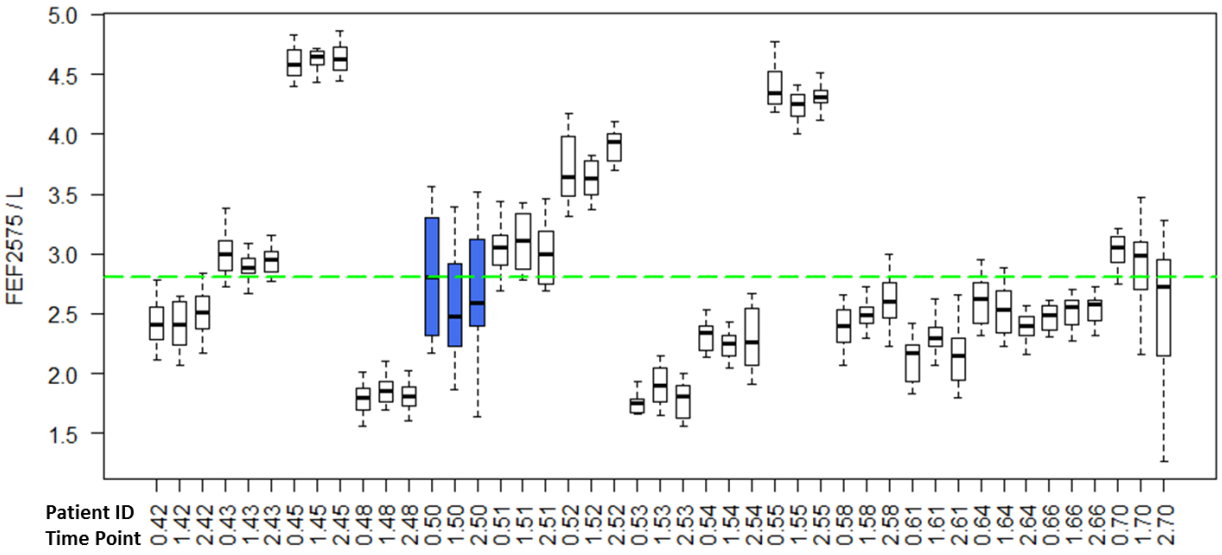

Figure S8: Boxplot of $FEF_{25-75\%}$ for female participants based on all measurements fulfilling within-maneuver criteria, grouped by time point (0=baseline, 1=immediate post-exposure, 2=Seven hours after exposure) and subject ID. Green dashed line = mean $FEF_{25-75\%}$.

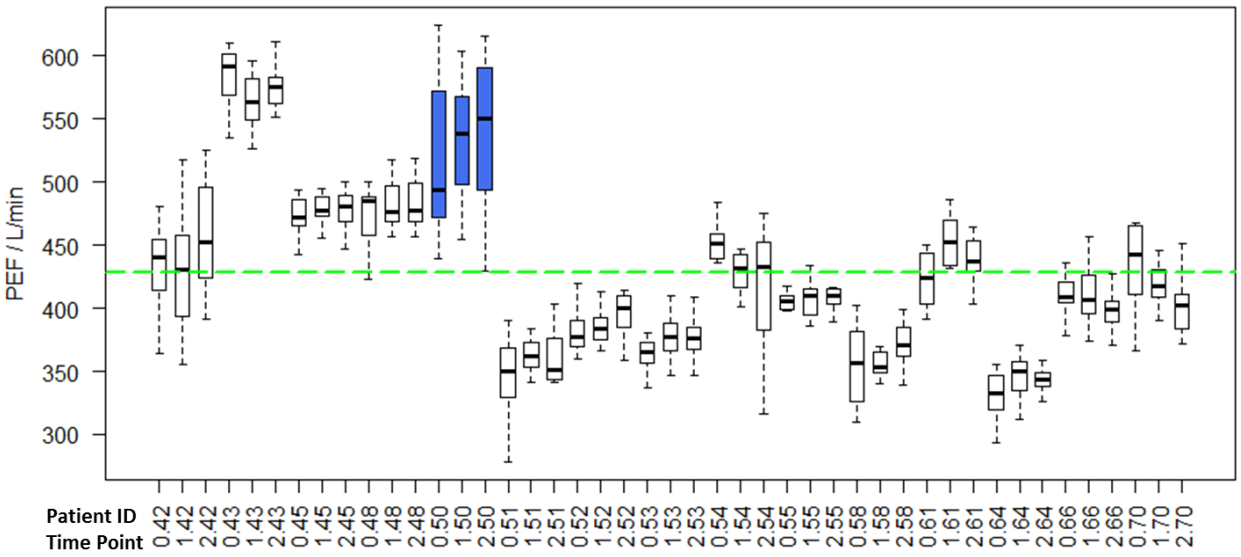

Figure S9: Boxplot for PEF for female participants based on all measurements fulfilling within-maneuver criteria, grouped by time point (0=baseline, 1=immediate post-exposure, 2=Seven hours after exposure) and subject ID. Green dashed line = mean PEF.

7) Outlier analysis

A measurement was defined as an outlier if for at least one respiratory outcome it was not within the whisker range of a boxplots plotting the percentage change from baseline grouped by exposure scenario and post-exposure time point.

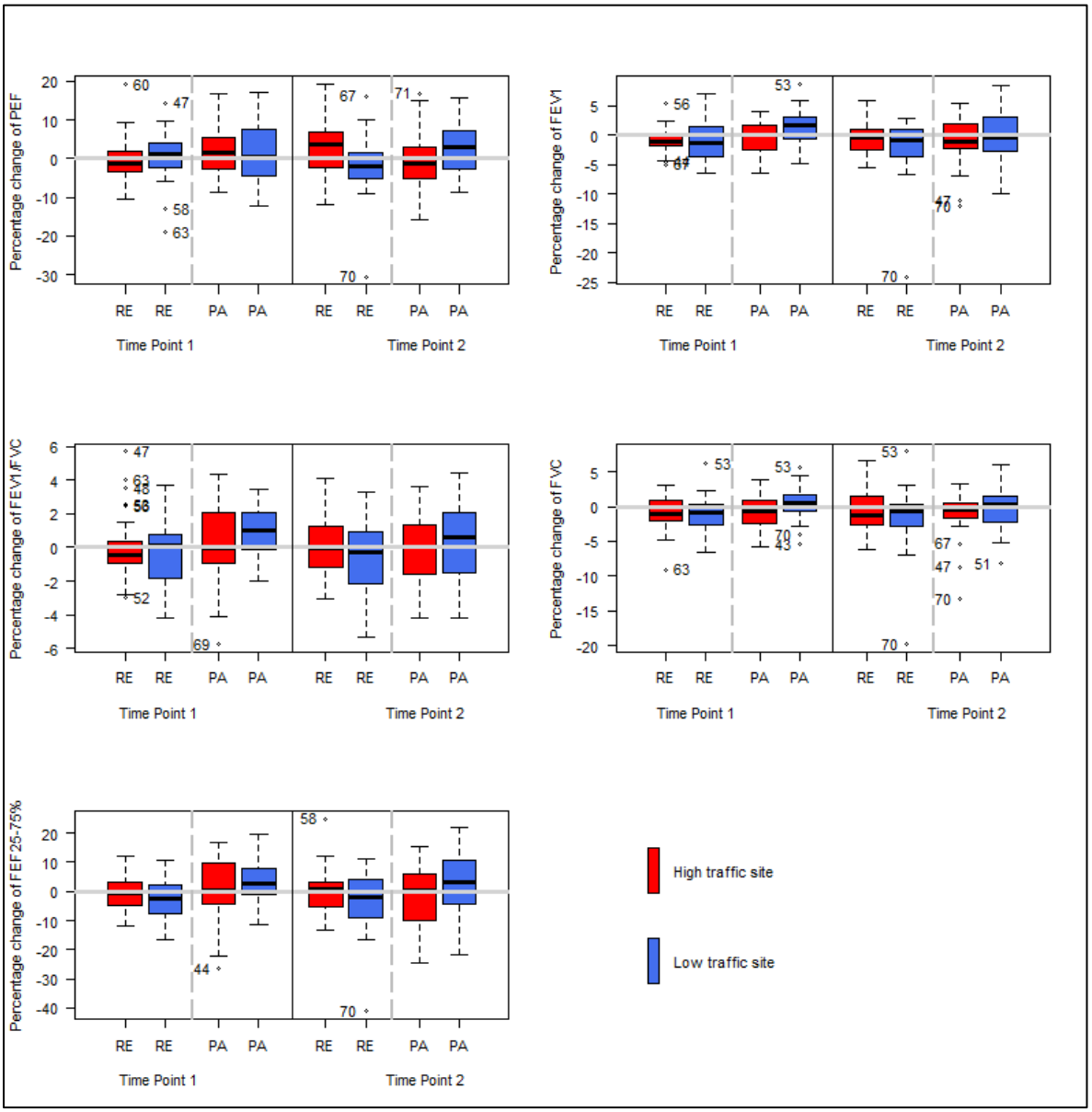

Figure S10: Percentage changes from baseline values of respiratory measures, grouped by exposure scenarios and post-exposure time points (T_1 and T_2). The upper whisker extends further until the smaller of the both values max(x) and Q3 + 1.5 * IQR. The lower whisker accordingly extends further until the greater of the both values min(x), Q1 - 1.5 * IQR. Measurements lying outside of this range are shown as dots labeled with the respective participants ID. Abbreviations: RE, Rest; PA, Physical activity; T1, Immediate post-exposure time point; T2, 7 hours after exposure.

Table S7: Count of Outliers by participants ID, time category and measurement

			Respiratory Outcome					
ID	TC	X	PEF	FEV_1	FEV_1/FVC	FVC	$FEF_{25-75\%}$	Total
43	T1	35	-	-	-	1	-	1
44	T2	38	-	1	-	-	-	1
47	T1	44	-	-	-	-	1	1
		62	-	-	1	-	-	1
48	T2	65	1	-	-	-	-	1
		69	-	1	-	1	-	2
	T1	74	-	-	1	-	-	1
51	T2	120	-	-	-	1	-	1
52	T1	122	-	-	1	-	-	1
53	T1	134	-	-	1	-	-	1
		137	-	-	-	1	-	1
		143	-	1	-	1	-	2
	T2	138	-	-	-	1	-	1
56	T1	170	-	1	1	-	-	2
58	T1	197	1	-	-	-	-	1
60	T2	195	-	-	-	-	1	1
	T1	218	1	-	-	-	-	1
63	T1	254	-	-	1	1	-	2
67	T1	257	1	-	-	-	-	1
		302	-	1	-	-	-	1
69	T2	306	1	-	-	-	-	1
		309	-	-	-	1	-	1
	T1	332	-	-	1	-	-	1
70	T1	347	-	-	-	1	-	1
	T2	342	1	1	-	1	1	4
		345	-	1	-	1	-	2
71	T2	357	1	-	-	-	-	1

Abbreviations: FEF25-75%, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; ID, participant identification number; PEF, Peak expiratory flow; T1, Immediate post-exposure time point; T2, Seven hours after exposure time point; TC, Time Category; X, Measurement identification number

8) Stability analysis: Excluding single participants

In the stability analysis participants considered to be potentially influential were excluded. They were selected based on the descriptive analyses in Part 6 & 7. Estimates and interaction terms that turned statistically significant in the stability analysis compared with the general analysis are marked in green, whereas estimates and interaction terms that turned statistically insignificant compared to the general analysis are marked in orange.

Exlusion of ID70

Table S8: Stability analysis for associations and interactions between respiratory outcomes, physical activity, pollutants and pre-exposure assessed using mixed effects models with continous covariates (ID70 excluded)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3	
	Estimate SP	Coeff.	95% CI	p		Coeff.	p	Coeff	p	Coeff.	p	Coeff.	95% CI	p		Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	95% CI	p		Coeff	p	Coeff.	p	Coef	p
PEF (L/min)	NO_X (ppm)	-5.73	(-24.6, 13.1)	0.55		1.18	0.20	0.003	0.84	0.40	0.35	11.57	(-1.6, 24.7)	**0.08**	E	-0.75	0.25	0.00	0.71	-0.18	0.55	2.96	(-10.22, 16.14)	0.66		0.23	0.72	0.00	0.73	0.11	0.72
	NO (ppm)	-6.28	(-27.5, 14.9)	0.56		1.35	0.21	0.002	0.86	0.44	0.40	11.98	(-2.9, 26.8)	0.11		-1.11	0.14	0.00	0.65	-0.31	0.40	2.89	(-11.97, 17.74)	0.70		0.14	0.85	0.00	0.72	0.06	0.86
	BC (10*µg/m^3)	-0.84	(-5.84, 4.16)	0.74		0.38	0.15	0.002	0.87	0.14	0.23	2.86	(-0.63, 6.35)	0.11		-0.20	0.29	0.00	0.65	-0.12	0.14	1.0	(-2.45, 4.53)	0.56		0.09	0.61	0.00	0.73	0.01	0.90
	UFP (10^5*cm^{-3})	-0.25	(-1.22, 0.72)	0.61		0.06	0.22	0.002	0.86	0.02	0.45	0.51	(-0.17, 1.19)	0.14		-0.05	0.19	0.00	0.65	-0.01	0.39	0.13	(-0.55, 0.81)	0.70		0.01	0.82	0.00	0.72	0.00	0.92
	$PM_{2.5}$ (µg/m^3)	-0.08	(-0.35, 0.20)	0.59		0.02	**0.07**	0.002	0.84	0.008	0.12	0.13	(-0.06, 0.33)	0.17		0.00	0.71	0.00	0.68	0.00	0.23	0.03	(-0.16, 0.23)	0.74		0.010	0.27	0.00	0.72	0.00	0.63
	PM_{10} (µg/m^3)	-0.07	(-0.23, 0.10)	0.44		0.01	**0.03**	0.003	0.79	0.007	**0.01**	0.04	(-0.08, 0.16)	0.49		0.00	0.81	0.00	0.65	0.00	0.19	-0.01	(-0.13, 0.11)	0.89		0.01	0.11	0.00	0.67	0.00	0.27
	PM_{coarse} (µg/m^3)	-0.14	(-0.51, 0.22)	0.43		0.03	**0.04**	0.004	0.77	0.013	**0.01**	-0.05	(-0.31, 0.21)	0.72		0.01	0.31	0.01	0.53	0.00	0.37	-0.09	(-0.34, 0.17)	0.51		0.02	**0.06**	0.00	0.60	0.01	0.15
FEV_1 (mL)	NO_X (ppm)	-47.1	(-106.9, 12.8)	0.12		-0.94	0.75	-0.04	0.35	-0.11	0.94	23.0	(-38.2, 84.1)	0.46		1.79	0.56	0.01	0.81	0.09	0.95	-12.1	(-64.33, 40.06)	0.64		0.43	0.87	-0.01	0.69	0.02	0.99
	NO (ppm)	-46.1	(-113.9, 21.6)	0.18		-0.38	0.91	-0.04	0.32	-0.14	0.93	24.5	(-44.5, 93.4)	0.48		1.88	0.60	0.01	0.79	-0.37	0.83	-10.9	(-69.75, 47.93)	0.71		0.76	0.80	-0.01	0.67	-0.23	0.87
	BC (10*µg/m^3)	-9.5	(-25.48, 6.48)	0.24		-0.46	0.59	-0.04	0.31	0.16	0.66	7.53	(-8.67, 23.72)	0.36		0.40	0.64	0.01	0.80	-0.19	0.62	-1.0	(-14.85, 12.87)	0.89		-0.04	0.959	-0.01	0.66	-0.01	0.97
	UFP (10^5*cm^{-3})	-1.96	(-5.06, 1.14)	0.21		-0.02	0.89	-0.04	0.31	-0.02	0.79	1.46	(-1.69, 4.60)	0.36		0.02	0.90	0.01	0.80	-0.04	0.54	-0.26	(-2.95, 2.43)	0.85		0.00	0.995	-0.01	0.66	-0.03	0.62
	$PM_{2.5}$ (µg/m^3)	-0.76	(-1.63, 0.12)	**0.09**		-0.03	0.42	-0.03	0.36	-0.01	0.73	0.30	(-0.60, 1.20)	0.50		0.02	0.71	0.01	0.81	-0.01	0.74	-0.23	(-0.99, 0.54)	0.55		-0.01	0.801	-0.01	0.70	-0.01	0.68
	PM_{10} (µg/m^3)	-0.67	(-1.20, -0.14)	**0.01**		-0.01	0.55	-0.03	0.46	0.00	0.94	-0.034	(-0.59, 0.52)	0.90		0.02	0.41	0.01	0.73	-0.01	0.60	-0.35	(-0.82, 0.12)	0.14		0.002	0.906	-0.01	0.83	0.00	0.70
	PM_{coarse} (µg/m^3)	-1.69	(-2.81, -0.56)	**0.004**	A	-0.009	0.84	-0.02	0.55	0.01	0.51	-0.70	(-1.89, 0.48)	0.24		0.06	0.18	0.02	0.58	-0.01	0.76	-1.19	(-2.18, -0.21)	**0.02**	A	0.02	0.51	0.00	0.98	0.00	0.88
FEV_1/FVC (%)	NO_X (ppm)	-0.55	(-1.20, 0.11)	0.10		0.01	0.70	-0.001	0.11	0.02	0.12	-0.187	(-0.91, 0.54)	0.61		-0.01	0.78	-0.0004	0.40	0.01	0.58	-0.370	(-0.91, 0.17)	0.18		0.002	0.96	-0.001	0.13	0.02	0.19
	NO (ppm)	-0.75	(-1.49, -0.02)	**0.05**		0.03	0.47	-0.001	0.10	0.03	0.16	-0.220	(-1.04, 0.60)	0.59		-0.01	0.76	-0.0004	0.39	0.01	0.71	-0.489	(-1.09, 0.12)	0.11		0.007	0.81	-0.001	0.12	0.02	0.27
	BC (10*µg/m^3)	-0.13	(-0.31, 0.05)	0.14		0.01	0.51	-0.001	**0.10**	0.011	**0.01**	-0.026	(-0.22, 0.17)	0.79		-0.005	0.66	-0.0004	0.38	0.001	0.77	-0.078	(-0.22, 0.07)	0.28		0.001	0.91	-0.001	0.11	0.01	**0.08**
	UFP (10^5*cm^{-3})	-0.03	(-0.07, 0.00)	**0.06**		0.00	0.57	-0.001	0.10	0.001	**0.09**	-0.010	(-0.05, 0.03)	0.60		-0.001	0.46	-0.0004	0.39	0.0003	0.71	-0.022	(-0.05, 0.01)	0.13		0.000	0.88	-0.001	0.12	0.00	0.19
	$PM_{2.5}$ (µg/m^3)	-0.005	(-0.02, 0.00)	0.28		0.00	0.82	-0.001	0.10	0.0004	**0.04**	-0.002	(-0.01, 0.01)	0.77		-0.0003	0.50	-0.0004	0.39	0.0002	0.38	-0.003	(-0.01, 0.00)	0.40		0.000	0.77	-0.001	0.12	0.00	**0.06**
	PM_{10} (µg/m^3)	-0.002	(-0.01, 0.00)	0.51		0.00	0.96	-0.001	**0.10**	0.0002	**0.04**	-0.001	(-0.01, 0.01)	0.74		-0.0002	0.41	-0.0004	0.40	0.0001	0.47	0.00	(-0.01, 0.00)	0.55		0.000	0.57	-0.001	0.12	0.00	**0.07**
	PM_{coarse} (µg/m^3)	0.001	(-0.01, 0.01)	0.87		0.00	0.65	-0.001	**0.07**	0.00	0.14	-0.002	(-0.02, 0.01)	0.75		-0.0004	0.42	-0.0004	0.40	0.0001	0.66	0.00	(-0.01, 0.01)	0.94		0.000	0.42	-0.001	**0.10**	0.00	0.22
FVC (mL)	NO_X (ppm)	-25	(-94.5, 44.4)	0.48		-1.84	0.59	-0.01	0.83	-1.31	0.40	25.5	(-36.4, 87.4)	0.41		1.4205	0.64	0.04	0.32	-0.67	0.64	0.2	(-56.11, 56.55)	0.99		-0.20	0.942	0.01	0.69	-0.96	0.45
	NO (ppm)	-14.7	(-93.1, 63.8)	0.71		-2.05	0.61	-0.01	0.79	-1.58	0.42	28.9	(-40.8, 98.6)	0.41		1.3068	0.72	0.04	0.31	-1.35	0.43	7.1	(-56.39, 70.51)	0.83		-0.36	0.912	0.01	0.70	-1.44	0.36
	BC (10*µg/m^3)	-4.62	(-23.1, 13.8)	0.62		-0.87	0.37	-0.01	0.80	-0.34	0.44	6.86	(-9.55, 23.27)	0.41		0.3922	0.65	0.04	0.31	-0.39	0.32	1.1	(-13.83, 16.04)	0.88		-0.25	0.753	0.01	0.70	-0.36	0.31
	UFP (10^5*cm^{-3})	-0.55	(-4.14, 3.03)	0.76		-0.10	0.60	-0.01	0.79	-0.09	0.28	1.73	(-1.45, 4.91)	0.28		0.0215	0.89	0.04	0.32	-0.09	0.21	0.58	(-2.32, 3.48)	0.69		-0.04	0.798	0.01	0.71	-0.09	0.18
	$PM_{2.5}$ (µg/m^3)	-0.59	(-1.60, 0.43)	0.25		-0.04	0.40	-0.01	0.87	-0.03	0.16	0.29	(-0.62, 1.20)	0.52		0.022	0.59	0.04	0.31	-0.02	0.30	-0.15	(-0.98, 0.67)	0.72		-0.01	0.819	0.02	0.66	-0.02	0.14
	PM_{10} (µg/m^3)	-0.69	(-1.30, -0.08)	**0.03**		-0.01	0.82	0.00	0.95	-0.01	0.26	-0.06	(-0.62, 0.50)	0.83		0.0313	0.17	0.04	0.26	-0.01	0.25	-0.38	(-0.88, 0.13)	0.14		0.01	0.554	0.02	0.51	-0.01	0.17
	PM_{coarse} (µg/m^3)	-2.11	(-3.38, -0.84)	**0.001**	A	0.03	0.51	0.01	0.76	0.00	0.98	-0.81	(-2.00, 0.39)	0.18		0.1014	**0.03**	B 0.05	0.17	-0.01	0.51	-1.46	(-2.51, -0.41)	**0.01**	A	0.065	0.105	0.03	0.34	-0.01	0.66

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure, respectively.
Abbreviations: BC, black coarse; $FEF_{25-75\%}$ Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

Exlusion of ID67

Table S9: Stability analysis for associations between respiratory outcomes, physical activity, pollutants and pre-exposure assessed using mixed effects models with continous covariates (ID67 excluded)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1				IA1			IA2			IA3				CO1				IA1			IA2			IA3				CO1				IA1			IA2			IA3			
	Estimate SP	Coeff.	95% CI	p		Coeff.	p		Coeff	p		Coeff.	p			Coeff.	95% CI	p		Coeff.	p		Coef	p		Coeff	p			Coeff.	95% CI	p		Coeff	p		Coeff.	p		Coeff.	p		
PEF (L/min)	NO_x (ppm)	-11.5	(-30.2, 7.2)	0.22		1.45	0.11		-0.003	0.79		0.15	0.72			13.27	(-0.7, 27.2)	**0.06**	E	-1.07	0.12		0.01	0.40		-0.06	0.85			5.87	(-6.83, 18.56)	0.36		-0.36	0.57		0.00	0.56		0.00	0.99	
	NO (ppm)	-12.2	(-33.2, 8.7)	0.25		1.67	0.12		-0.004	0.75		0.08	0.89			13.97	(-1.7, 29.7)	**0.08**		-1.50	**0.06**		0.01	0.36		-0.13	0.75			6.08	(-8.17, 20.32)	0.40		-0.61	0.40		0.00	0.54		-0.07	0.85	
	BC (10*µg/m^3)	-2.07	(-6.99, 2.86)	0.41		0.44	**0.09**		-0.004	0.75		0.08	0.51			3.32	(-0.34, 6.98)	**0.08**		-0.32	0.10		0.01	0.35		-0.09	0.33			1.7	(-1.59, 5.05)	0.30		-0.10	0.57		0.01	0.53		-0.04	0.65	
	UFP (10^5*cm^{-3})	-0.5	(-1.46, 0.46)	0.30		0.07	0.13		-0.004	0.75		0.00	0.89			0.58	(-0.14, 1.29)	0.12		-0.06	**0.08**		0.01	0.36		-0.01	0.66			0.25	(-0.40, 0.90)	0.45		-0.02	0.45		0.00	0.54		0.00	0.78	
	$PM_{2.5}$ (µg/m^3)	-0.14	(-0.41, 0.13)	0.30		0.02	**0.04**	B	-0.003	0.79		0.006	0.21			0.15	(-0.05, 0.36)	0.14		-0.01	0.37		0.01	0.39		0.00	0.33			0.07	(-0.12, 0.25)	0.46		0.002	0.81		0.00	0.56		0.00	0.89	
	PM_{10} (µg/m^3)	-0.10	(-0.27, 0.06)	0.22		0.02	**0.01**		-0.003	0.83		0.007	**0.03**	C		0.05	(-0.08, 0.17)	0.45		0.00	0.65		0.01	0.39		0.00	0.27			0.01	(-0.11, 0.12)	0.93		0.00	0.40		0.00	0.55		0.00	0.79	
	PM_{coarse} (µg/m^3)	-0.19	(-0.55, 0.16)	0.28		0.03	**0.01**		-0.003	0.83		0.013	**0.012**			-0.05	(-0.32, 0.22)	0.74		0.00	0.76		0.01	0.34		0.00	0.45			-0.08	(-0.32, 0.16)	0.51		0.01	0.15		0.01	0.50		0.00	0.48	
FEV_1 (mL)	NO_x (ppm)	-29.6	(-91.3, 32.1)	0.34		-2.21	0.47		-0.04	0.36		0.57	0.69			33.9	(-33.9, 101.7)	0.32		-0.49	0.89		0.02	0.58		0.37	0.82			-3.6	(-58.74, 51.63)	0.90		-1.52	0.58		-0.01	0.74		0.51	0.69	
	NO (ppm)	-27	(-96.3, 42.3)	0.44		-1.90	0.60		-0.04	0.34		0.89	0.62			36.2	(-39.9, 112.2)	0.35		-0.87	0.83		0.03	0.55		0.05	0.98			-0.9	(-62.75, 60.98)	0.98		-1.47	0.65		-0.01	0.73		0.56	0.73	
	BC (10*µg/m^3)	-4.68	(-20.9, 11.6)	0.57		-0.79	0.36		-0.04	0.34		0.48	0.24			9.94	(-7.8, 27.7)	0.27		-0.35	0.71		0.03	0.54		-0.14	0.76			1.4	(-13.03, 15.90)	0.84		-0.62	0.418		-0.01	0.74		0.22	0.54	
	UFP (10^5*cm^{-3})	-1.01	(-4.18, 2.16)	0.53		-0.08	0.63		-0.04	0.34		0.03	0.71			1.90	(-1.57, 5.37)	0.28		-0.11	0.55		0.03	0.55		-0.03	0.69			0.19	(-2.63, 3.02)	0.89		-0.09	0.528		-0.01	0.74		0.00	0.97	
	$PM_{2.5}$ (µg/m^3)	-0.44	(-1.34, 0.45)	0.33		-0.04	0.30		-0.04	0.36		0.00	0.79			0.46	(-0.52, 1.45)	0.35		-0.01	0.75		0.02	0.57		0.00	0.82			-0.07	(-0.87, 0.73)	0.86		-0.03	0.384		-0.01	0.74		0.00	0.97	
	PM_{10} (µg/m^3)	-0.43	(-0.98, 0.11)	0.12		-0.02	0.49		-0.03	0.40		0.01	0.38			0.035	(-0.57, 0.64)	0.91		0.00	1.00		0.03	0.55		-0.01	0.65			-0.24	(-0.73, 0.25)	0.32		-0.010	0.619		-0.01	0.77		0.00	0.74	
	PM_{coarse} (µg/m^3)	-1.15	(-2.30, 0.01)	**0.05**	A	-0.006	0.90		-0.03	0.43		0.02	0.14			-0.63	(-1.92, 0.66)	0.33		0.03	0.55		0.03	0.47		-0.01	0.76			-0.93	(-1.96, 0.10)	**0.08**	A	0.01	0.86		-0.01	0.85		0.01	0.41	
FEV_1/FVC (%)	NO_x (ppm)	-0.33	(-1.03, 0.37)	0.35		0.02	0.64		-0.001	**0.08**	D	0.03	**0.04**			-0.043	(-0.84, 0.76)	0.92		-0.02	0.65		0.00	0.41		0.01	0.48			-0.212	(-0.81, 0.38)	0.48		0.003	0.93		-0.001	**0.10**	D	0.02	**0.07**	
	NO (ppm)	-0.5	(-1.28, 0.28)	0.20		0.03	0.45		-0.001	**0.07**		0.04	**0.04**			-0.039	(-0.94, 0.86)	0.93		-0.02	0.62		0.00	0.41		0.01	0.53			-0.313	(-0.98, 0.35)	0.35		0.009	0.78		-0.001	**0.09**		0.03	**0.08**	
	BC (10*µg/m^3)	-0.07	(-0.25, 0.12)	0.46		0.01	0.50		-0.001	**0.07**		0.014	**0.001**	C		0.014	(-0.20, 0.22)	0.90		-0.01	0.47		0.00	0.41		0.00	0.72			-0.032	(-0.19, 0.12)	0.68		0.001	0.94		-0.001	**0.09**		0.01	**0.01**	C
	UFP (10^5*cm^{-3})	-0.02	(-0.06, 0.01)	0.24		0.00	0.51		-0.001	**0.07**		0.002	**0.03**			-0.003	(-0.04, 0.04)	0.88		-0.002	0.37		0.00	0.41		0.00	0.64			-0.014	(-0.04, 0.02)	0.37		0.000	0.98		-0.001	**0.09**		0.001	**0.07**	
	$PM_{2.5}$ (µg/m^3)	-0.002	(-0.01, 0.01)	0.67		0.00	0.81		-0.001	**0.08**		0.0004	**0.02**			0.000	(-0.01, 0.01)	0.99		0.000	0.35		0.00	0.41		0.00	0.49			-0.001	(-0.01, 0.01)	0.84		0.000	0.73		-0.001	**0.09**		0.0003	**0.04**	
	PM_{10} (µg/m^3)	0.000	(-0.01, 0.01)	0.99		0.00	0.95		-0.001	**0.07**		0.0003	**0.01**			-0.001	(-0.01, 0.01)	0.88		0.000	0.29		0.00	0.42		0.00	0.69			0.00	(-0.01, 0.01)	0.98		0.000	0.59		-0.001	**0.09**		0.0002	**0.04**	
	PM_{coarse} (µg/m^3)	0.004	(-0.01, 0.02)	0.50		0.00	0.75		-0.001	**0.06**		0.00	**0.09**			-0.003	(-0.02, 0.01)	0.74		-0.001	0.33		0.00	0.43		0.00	0.94			0.00	(-0.01, 0.01)	0.68		0.000	0.45		-0.001	**0.08**		0.0002	0.22	
FVC (mL)	NO_x (ppm)	-10.5	(-80.5, 59.5)	0.77		-3.51	0.31		-0.01	0.91		-0.82	0.61			34.3	(-32.2, 100.9)	0.31		-1.35	0.68		0.06	0.18		-0.59	0.70			13.8	(-43.74, 71.33)	0.63		-2.37	0.405		0.03	0.44		-0.68	0.61	
	NO (ppm)	0.582	(-77.9, 79.1)	0.99		-4.01	0.32		-0.01	0.90		-0.89	0.66			37.4	(-37.2, 112.1)	0.32		-2.00	0.60		0.06	0.17		-1.30	0.50			20.5	(-43.87, 84.96)	0.53		-2.93	0.376		0.03	0.43		-1.10	0.51	
	BC (10*µg/m^3)	-0.76	(-19.1, 17.6)	0.93		-1.28	0.19		-0.01	0.90		-0.11	0.81			8.46	(-9.0, 25.9)	0.34		-0.45	0.62		0.06	0.17		-0.40	0.36			4.2	(-10.85, 19.30)	0.58		-0.86	0.282		0.03	0.43		-0.27	0.47	
	UFP (10^5*cm^{-3})	0.234	(-3.35, 3.82)	0.90		-0.17	0.34		-0.01	0.90		-0.05	0.54			2.05	(-1.35, 5.46)	0.23		-0.13	0.46		0.06	0.17		-0.09	0.27			1.22	(-1.72, 4.16)	0.41		-0.15	0.318		0.03	0.43		-0.07	0.30	
	$PM_{2.5}$ (µg/m^3)	-0.3	(-1.32, 0.71)	0.55		-0.05	0.27		0.00	0.92		-0.02	0.39			0.44	(-0.53, 1.41)	0.37		-0.01	0.83		0.06	0.18		-0.02	0.36			0.09	(-0.74, 0.93)	0.82		-0.03	0.432		0.03	0.44		-0.02	0.28	
	PM_{10} (µg/m^3)	-0.46	(-1.08, 0.16)	0.14		-0.01	0.71		0.00	0.99		0.00	0.78			0.01	(-0.59, 0.61)	0.97		0.01	0.64		0.06	0.17		-0.01	0.30			-0.21	(-0.73, 0.30)	0.41		0.00	0.972		0.03	0.40		-0.01	0.40	
	PM_{coarse} (µg/m^3)	-1.54	(-2.83, -0.26)	**0.02**	A	0.03	0.49		0.00	0.91		0.01	0.44			-0.69	(-1.96, 0.57)	0.28		0.07	0.17	B	0.06	0.13		-0.01	0.56			-1.11	(-2.18, -0.04)	**0.04**	A	0.05	0.223		0.04	0.33		0.001	0.97	

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

Exclusion of ID63

Table S10: Stability analysis for associations between respiratory outcomes, physical activity, pollutants and pre-exposure assessed using mixed effects models with continous covariates (ID63 excluded)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1			IA1		IA2		IA3			CO1			IA1		IA2		IA3			CO1			IA1		IA2		IA3		
	Estimate SP	Coeff.	95% CI	p	Coeff	p	Coeff	p	Coeff.	p		Coeff.	95% CI	p	Coeff	p	Coef	p	Coeff	p		Coeff.	95% CI	p	Coeff	p	Coeff.	p	Coef	p	
PEF (L/min)	NO_x (ppm)	-9.09	(-26.1, 7.9)	0.29	1.57	**0.06**	0.008	0.44	0.48	0.20		10.84	(-2.7, 24.4)	0.12	E -0.96	0.15	0.01	0.43	-0.13	0.66		3.51	(-8.0, 15.0)	0.55	-0.04	0.95	0.01	0.29	0.09	0.73	
	NO (ppm)	-10.1	(-29.2, 9.0)	0.30	1.78	**0.07**	0.008	0.47	0.50	0.28		11.12	(-4.2, 26.4)	0.15	-1.39	**0.08**	0.01	0.39	-0.24	0.51		3.30	(-9.7, 16.3)	0.61	-0.24	0.72	0.01	0.28	0.02	0.94	
	BC (10*µg/m^3)	-1.73	(-6.2, 2.8)	0.45	0.50	**0.03**	0.008	0.48	0.17	**0.10**		2.47	(-1.13, 6.07)	0.18	-0.27	0.16	0.01	0.39	-0.11	0.17		1.0	(-2.1, 4.0)	0.53	0.01	0.93	0.01	0.28	-0.01	0.90	
	UFP (10^5*cm^{-3})	-0.43	(-1.30, 0.45)	0.33	0.09	**0.04**	0.008	0.48	0.02	0.27		0.44	(-0.27, 1.14)	0.22	-0.05	0.13	0.01	0.38	-0.01	0.45		0.12	(-0.48, 0.71)	0.69	0.00	1.00	0.01	0.27	0.00	0.98	
	$PM_{2.5}$ (µg/m^3)	-0.1	(-0.35, 0.15)	0.42	0.03	**0.02**	B 0.008	0.46	0.010	**0.03**		0.12	(-0.08, 0.32)	0.23	-0.01	0.47	0.01	0.41	0.00	0.23		0.04	(-0.12, 0.21)	0.60	0.006	0.43	0.01	0.28	0.00	0.76	
	PM_{10} (µg/m^3)	-0.05	(-0.20, 0.10)	0.49	0.01	**0.02**	0.008	0.45	0.008	**0.002**	C	0.03	(-0.09, 0.15)	0.57	-0.002	0.64	0.01	0.39	0.00	0.13		0.01	(-0.09, 0.11)	0.88	0.00	0.36	0.01	0.27	0.00	0.47	
	PM_{coarse} (µg/m^3)	-0.04	(-0.36, 0.27)	0.79	0.02	**0.09**	0.008	0.49	0.013	**0.003**		-0.04	(-0.30, 0.21)	0.74	0.001	0.95	0.01	0.32	0.00	0.23		-0.03	(-0.24, 0.19)	0.79	0.01	0.35	0.01	0.24	0.00	0.37	
FEV_1 (mL)	NO_x (ppm)	-50.1	(-107.7, 7.4)	**0.09**	-0.80	0.78	-0.02	0.50	0.60	0.64		15.8	(-47.1, 78.7)	0.62	0.72	0.82	0.02	0.55	0.48	0.74		-22.2	(-72.5, 28.1)	0.38	-0.16	0.95	0.00	0.90	0.57	0.61	
	NO (ppm)	-49.1	(-114.3, 16.0)	0.14	-0.34	0.92	-0.03	0.45	0.72	0.65		15.8	(-55.1, 86.6)	0.66	0.52	0.89	0.03	0.53	0.12	0.94		-21.3	(-78.0, 35.4)	0.46	0.04	0.99	-0.01	0.86	0.48	0.73	
	BC (10*µg/m^3)	-10.2	(-25.5, 5.1)	0.19	-0.39	0.63	-0.03	0.44	0.39	0.28		4.70	(-11.9, 21.3)	0.57	-0.02	0.99	0.02	0.54	-0.14	0.72		-3.8	(-17.1, 9.6)	0.58	-0.24	0.73	-0.01	0.86	0.16	0.60	
	UFP (10^5*cm^{-3})	-2.11	(-5.09, 0.88)	0.16	0.01	0.93	-0.03	0.44	0.02	0.77		0.81	(-2.43, 4.05)	0.62	-0.01	0.96	0.03	0.53	-0.03	0.72		-0.85	(-3.45, 1.74)	0.51	0.00	0.98	-0.01	0.86	0.00	1.00	
	$PM_{2.5}$ (µg/m^3)	-0.73	(-1.57, 0.10)	**0.09**	-0.03	0.42	-0.03	0.49	0.00	0.82		0.19	(-0.72, 1.11)	0.67	0.00	0.91	0.02	0.54	-0.01	0.77		-0.34	(-1.07, 0.39)	0.36	-0.02	0.54	-0.004	0.90	0.00	0.98	
	PM_{10} (µg/m^3)	-0.56	(-1.06, -0.06)	**0.03**	-0.02	0.45	-0.02	0.57	0.01	0.55		-0.079	(-0.63, 0.47)	0.78	0.00	0.89	0.03	0.48	-0.01	0.45		-0.36	(-0.79, 0.08)	0.11	-0.011	0.54	-0.001	0.99	0.00	0.98	
	PM_{coarse} (µg/m^3)	-1.26	(-2.32, -0.20)	**0.02**	A -0.02	0.64	-0.02	0.60	0.02	0.28		-0.67	(-1.83, 0.50)	0.26	0.003	0.95	0.03	0.40	-0.01	0.47		-1.00	(-1.92, -0.09)	**0.03**	A -0.01	0.75	0.003	0.92	0.00	0.76	
FEV_1/FVC (%)	NO_x (ppm)	-0.47	(-1.15, 0.21)	0.18	0.01	0.88	-0.001	**0.08**	D 0.03	**0.03**		-0.088	(-0.84, 0.67)	0.82	-0.01	0.69	0.00	0.64	0.01	0.46		-0.304	(-0.88, 0.27)	0.29	-0.003	0.92	-0.001	0.15	D 0.02	**0.06**	
	NO (ppm)	-0.66	(-1.42, 0.10)	**0.09**	0.02	0.65	-0.001	**0.07**	0.04	**0.04**		-0.101	(-0.95, 0.75)	0.81	-0.02	0.64	0.00	0.63	0.01	0.54		-0.422	(-1.06, 0.22)	0.19	0.002	0.95	-0.001	0.14	0.03	**0.08**	
	BC (10*µg/m^3)	-0.1	(-0.29, 0.08)	0.25	0.004	0.70	-0.001	**0.07**	0.013	**0.001**	C	-0.006	(-0.21, 0.19)	0.95	-0.01	0.54	0.00	0.63	0.00	0.71		-0.060	(-0.21, 0.09)	0.43	-0.001	0.94	-0.001	0.13	0.01	**0.01**	C
	UFP (10^5*cm^{-3})	-0.03	(-0.06, 0.01)	0.11	0.001	0.68	-0.001	**0.07**	0.002	**0.02**		-0.007	(-0.05, 0.03)	0.74	0.00	0.47	0.00	0.64	0.00	0.59		-0.019	(-0.05, 0.01)	0.20	0.000	0.91	-0.001	0.13	0.00	**0.05**	
	$PM_{2.5}$ (µg/m^3)	-0.004	(-0.01, 0.01)	0.45	0.000	0.97	-0.001	**0.07**	0.0005	**0.01**		0.000	(-0.01, 0.01)	0.96	0.00	0.38	0.00	0.63	0.00	0.41		-0.002	(-0.01, 0.01)	0.65	0.000	0.64	-0.001	0.13	0.00	**0.03**	
	PM_{10} (µg/m^3)	-0.001	(-0.01, 0.01)	0.78	0.000	0.89	-0.001	**0.07**	0.0003	**0.01**		0.000	(-0.01, 0.01)	0.97	0.00	0.19	0.00	0.62	0.00	0.65		0.00	(-0.01, 0.00)	0.92	0.000	0.40	-0.001	0.12	0.00	**0.04**	
	PM_{coarse} (µg/m^3)	0.003	(-0.01, 0.02)	0.59	0.000	0.64	-0.001	**0.05**	0.00	**0.09**		0.000	(-0.01, 0.01)	0.99	0.00	0.11	0.00	0.62	0.00	0.97		0.00	(-0.01, 0.01)	0.64	-0.001	0.21	-0.001	0.10	0.00	0.25	
FVC (mL)	NO_x (ppm)	-31.9	(-93.8, 30.0)	0.31	-0.89	0.77	0.01	0.73	-0.82	0.56		18.1	(-45.6, 81.8)	0.57	0.345	0.91	0.04	0.28	-0.34	0.81		-8.2	(-61.2, 44.8)	0.76	-0.32	0.90	0.03	0.40	-0.57	0.63	
	NO (ppm)	-22.1	(-92.1, 48.0)	0.53	-1.08	0.77	0.01	0.78	-1.08	0.53		19.4	(-52.4, 91.2)	0.59	0.084	0.98	0.04	0.27	-0.89	0.61		-2.2	(-61.9, 57.5)	0.94	-0.53	0.86	0.03	0.42	-0.97	0.50	
	BC (10*µg/m^3)	-6.63	(-23.0, 9.8)	0.42	-0.56	0.52	0.01	0.77	-0.17	0.65		4.13	(-12.7, 21.0)	0.63	-0.06	0.95	0.05	0.27	-0.35	0.37		-1.5	(-15.5, 12.5)	0.83	-0.33	0.65	0.03	0.42	-0.26	0.43	
	UFP (10^5*cm^{-3})	-0.93	(-4.14, 2.27)	0.56	-0.01	0.95	0.01	0.79	-0.06	0.37		1.02	(-2.26, 4.30)	0.54	-0.01	0.98	0.04	0.27	-0.07	0.32		0.00	(-2.73, 2.73)	1.00	-0.01	0.95	0.03	0.42	-0.07	0.27	
	$PM_{2.5}$ (µg/m^3)	-0.61	(-1.51, 0.28)	0.18	-0.03	0.47	0.02	0.70	-0.02	0.26		0.17	(-0.76, 1.09)	0.72	5E-04	0.99	0.05	0.27	-0.02	0.30		-0.25	(-1.02, 0.52)	0.52	-0.02	0.65	0.03	0.39	-0.02	0.19	
	PM_{10} (µg/m^3)	-0.58	(-1.11, -0.05)	**0.03**	-0.01	0.68	0.02	0.58	-0.01	0.45		-0.13	(-0.69, 0.43)	0.65	0.009	0.70	0.05	0.23	-0.01	0.17		-0.37	(-0.83, 0.08)	0.11	0.00	0.94	0.03	0.31	-0.01	0.20	
	PM_{coarse} (µg/m^3)	-1.58	(-2.69, -0.47)	**0.01**	A 0.01	0.83	0.03	0.49	0.00	0.81		-0.83	(-2.01, 0.34)	0.16	0.048	0.32	B 0.06	0.17	-0.02	0.29		-1.24	(-2.19, -0.29)	**0.01**	A 0.025	0.51	0.04	0.22	-0.01	0.63	

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

Exclusion of ID69

Table S11: Stability analysis for associations between respiratory outcomes, physical activity, pollutants and pre-exposure assessed using mixed effects models with continous covariates (ID69 excluded)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3	
	Estimate SP	Coeff.	95% CI	p		Coeff.	p	Coeff	p	Coeff.	p	Coef	95% CI	p		Coeff.	p	Coef	p	Coeff	p	Coeff.	95% CI	p		Coeff	p	Coeff.	p	Coef	p
PEF (L/min)	NO_x (ppm)	-2.52	(-21.1, 16.0)	0.79		1.00	0.28	0.000	1.00	0.35	0.41	13.0	(-0.9, 26.8)	**0.07**	E	-0.85	0.22	0.00	0.94	-0.17	0.59	8.37	(-4.3, 21.0)	0.19		-0.32	0.61	0.00	0.92	-0.02	0.94
	NO (ppm)	-2.98	(-23.7, 17.8)	0.78		1.14	0.29	0.000	1.00	0.39	0.45	13.9	(-1.6, 29.4)	**0.08**		-1.21	0.13	0.00	0.88	-0.30	0.45	8.89	(-5.3, 23.1)	0.21		-0.54	0.46	0.00	0.87	-0.10	0.78
	BC (10*µg/m^3)	-0.1	(-4.94, 4.73)	0.97		0.34	0.19	0.000	0.99	0.14	0.22	3.10	(-0.52, 6.71)	**0.09**		-0.26	0.18	0.00	0.87	-0.12	0.15	2.2	(-1.13, 5.45)	0.19		-0.09	0.62	0.00	0.87	-0.05	0.53
	UFP (10^5*cm^{-3})	-0.1	(-1.05, 0.85)	0.84		0.05	0.28	0.000	0.99	0.02	0.44	0.60	(-0.11, 1.31)	**0.10**		-0.05	0.18	0.00	0.88	-0.02	0.31	0.39	(-0.26, 1.04)	0.23		-0.02	0.56	0.00	0.87	-0.01	0.64
	$PM_{2.5}$ (µg/m^3)	-0.02	(-0.29, 0.25)	0.87		0.02	**0.09**	0.000	1.00	0.008	0.11	0.14	(-0.06, 0.35)	0.16		-0.01	0.49	0.00	0.92	-0.01	0.17	0.10	(-0.08, 0.28)	0.29		0.002	0.83	0.00	0.91	0.00	0.73
	PM_{10} (µg/m^3)	-0.03	(-0.19, 0.14)	0.75		0.01	**0.04**	0.000	0.98	0.007	**0.01**	0.04	(-0.09, 0.16)	0.57		-0.001	0.81	0.00	0.88	0.00	0.15	0.02	(-0.09, 0.13)	0.71		0.00	0.45	0.00	0.87	0.00	0.89
	PM_{coarse} (µg/m^3)	-0.05	(-0.40, 0.29)	0.75		0.03	**0.04**	0.000	0.98	0.013	**0.005**	-0.08	(-0.34, 0.18)	0.54		0.005	0.63	0.00	0.76	0.00	0.38	-0.06	(-0.30, 0.18)	0.61		0.01	0.20	0.00	0.78	0.00	0.50
FEV_1 (mL)	NO_x (ppm)	-33.5	(-93.2, 26.1)	0.27		-2.03	0.49	-0.04	0.26	0.40	0.77	46.0	(-17.7, 109.7)	0.15		-1.32	0.68	0.01	0.84	-0.41	0.78	1.5	(-50.7, 53.7)	0.96		-1.73	0.51	-0.02	0.53	0.06	0.96
	NO (ppm)	-31.6	(-98.6, 35.3)	0.35		-1.76	0.61	-0.05	0.24	0.64	0.70	47.9	(-23.5, 119.3)	0.19		-1.84	0.62	0.01	0.79	-0.79	0.66	3.5	(-54.9, 62.0)	0.90		-1.80	0.55	-0.02	0.53	0.02	0.99
	BC (10*µg/m^3)	-5.74	(-21.3, 9.9)	0.47		-0.72	0.39	-0.05	0.24	0.31	0.41	11.69	(-4.9, 28.3)	0.16		-0.48	0.59	0.01	0.79	-0.36	0.37	2.0	(-11.5, 15.6)	0.77		-0.62	0.390	-0.02	0.53	0.01	0.97
	UFP (10^5*cm^{-3})	-1.4	(-4.46, 1.66)	0.36		-0.08	0.60	-0.05	0.24	0.02	0.78	2.26	(-1.01, 5.52)	0.17		-0.14	0.39	0.01	0.79	-0.06	0.40	0.22	(-2.46, 2.89)	0.87		-0.11	0.415	-0.02	0.53	-0.02	0.78
	$PM_{2.5}$ (µg/m^3)	-0.54	(-1.40, 0.33)	0.22		-0.04	0.27	-0.04	0.26	0.00	0.98	0.57	(-0.36, 1.50)	0.23		-0.02	0.58	0.01	0.83	-0.02	0.38	-0.05	(-0.81, 0.71)	0.90		-0.03	0.305	-0.02	0.54	-0.01	0.61
	PM_{10} (µg/m^3)	-0.49	(-1.01, 0.03)	**0.06**		-0.02	0.48	-0.04	0.31	0.00	0.69	0.081	(-0.49, 0.65)	0.78		0.00	0.90	0.01	0.78	-0.01	0.24	-0.25	(-0.71, 0.21)	0.28		-0.011	0.575	-0.02	0.59	0.00	0.70
	PM_{coarse} (µg/m^3)	-1.26	(-2.34, -0.17)	**0.03**	A	-0.003	0.94	-0.04	0.35	0.01	0.33	-0.58	(-1.78, 0.62)	0.34		0.03	0.58	0.02	0.65	-0.01	0.38	-0.97	(-1.92, -0.01)	**0.05**	A	0.01	0.84	-0.01	0.69	0.00	0.88
FEV_1/FVC (%)	NO_x (ppm)	-0.38	(-1.06, 0.31)	0.27		0.01	0.69	-0.001	**0.04**	0.03	**0.04**	0.210	(-0.52, 0.94)	0.57		-0.04	0.24	0.00	0.26	0.00	0.87	-0.112	(-0.68, 0.45)	0.69		-0.013	0.66	-0.001	**0.04**	0.02	0.15
	NO (ppm)	-0.54	(-1.31, 0.22)	0.16		0.03	0.47	-0.001	**0.04**	0.04	**0.05**	0.208	(-0.61, 1.03)	0.62		-0.05	0.22	0.00	0.27	0.00	0.91	-0.206	(-0.84, 0.43)	0.52		-0.008	0.81	-0.001	**0.04**	0.02	0.18
	BC (10*µg/m^3)	-0.08	(-0.26, 0.10)	0.37		0.01	0.60	-0.001	**0.03**	0.012	**0.003**	0.057	(-0.13, 0.25)	0.55		-0.01	0.18	0.00	0.27	0.00	0.90	-0.016	(-0.16, 0.13)	0.83		-0.004	0.64	-0.001	**0.04**	0.01	**0.05**
	UFP (10^5*cm^{-3})	-0.02	(-0.06, 0.01)	0.20		0.00	0.53	-0.001	**0.04**	0.002	**0.03**	0.007	(-0.03, 0.04)	0.70		-0.003	0.11	0.00	0.27	0.00	0.94	-0.009	(-0.04, 0.02)	0.53		-0.001	0.59	-0.001	**0.04**	0.00	0.14
	$PM_{2.5}$ (µg/m^3)	-0.003	(-0.01, 0.01)	0.58		0.00	0.94	-0.001	**0.04**	0.0004	**0.03**	0.003	(-0.01, 0.01)	0.53		-0.001	0.12	0.00	0.25	0.00	0.81	0.001	(-0.01, 0.01)	0.91		0.000	0.38	-0.001	**0.04**	0.00	**0.09**
	PM_{10} (µg/m^3)	0.000	(-0.01, 0.01)	0.89		0.000	0.88	-0.001	**0.03**	0.0002	**0.02**	0.001	(-0.01, 0.01)	0.66		0.000	**0.09**	0.00	0.25	0.00	0.97	0.00	(0.00, 0.01)	0.77		0.000	0.27	-0.001	**0.04**	0.00	0.10
	PM_{coarse} (µg/m^3)	0.004	(-0.01, 0.02)	0.58		0.000	0.60	-0.001	**0.02**	0.00	0.11	0.001	(-0.01, 0.01)	0.91		-0.001	0.13	0.00	0.27	0.00	0.82	0.00	(-0.01, 0.01)	0.57		-0.001	0.22	-0.001	**0.03**	0.00	0.32
FVC (mL)	NO_x (ppm)	-13.7	(-81.0, 53.6)	0.69		-3.24	0.33	-0.01	0.86	-1.02	0.51	36.4	(-29.4, 102.3)	0.27		-0.85	0.79	0.05	0.28	-0.84	0.58	12.3	(-43.7, 68.2)	0.66		-2.03	0.465	0.02	0.58	-0.91	0.48
	NO (ppm)	-3.9	(-79.3, 71.5)	0.92		-3.81	0.33	-0.01	0.84	-1.06	0.57	39.6	(-34.2, 113.3)	0.29		-1.45	0.70	0.05	0.26	-1.43	0.44	18.7	(-43.9, 81.2)	0.55		-2.60	0.421	0.02	0.57	-1.23	0.43
	BC (10*µg/m^3)	-1.64	(-19.2, 15.9)	0.85		-1.13	0.22	-0.01	0.84	-0.23	0.59	8.61	(-8.6, 25.8)	0.32		-0.26	0.78	0.05	0.26	-0.48	0.24	3.7	(-10.9, 18.2)	0.62		-0.70	0.365	0.02	0.57	-0.36	0.30
	UFP (10^5*cm^{-3})	-0.21	(-3.66, 3.23)	0.90		-0.18	0.31	-0.01	0.84	-0.06	0.48	1.98	(-1.38, 5.35)	0.24		-0.11	0.54	0.05	0.26	-0.10	0.21	0.92	(-1.94, 3.78)	0.52		-0.14	0.332	0.02	0.57	-0.08	0.24
	$PM_{2.5}$ (µg/m^3)	-0.4	(-1.37, 0.58)	0.42		-0.05	0.27	-0.01	0.89	-0.02	0.24	0.40	(-0.56, 1.36)	0.40		-0.01	0.90	0.05	0.27	-0.02	0.19	0.01	(-0.80, 0.82)	0.98		-0.03	0.451	0.02	0.56	-0.02	0.13
	PM_{10} (µg/m^3)	-0.52	(-1.11, 0.06)	**0.08**		-0.01	0.78	0.00	1.00	-0.01	0.46	-0.03	(-0.62, 0.56)	0.92		0.02	0.52	0.05	0.24	-0.02	0.13	-0.28	(-0.77, 0.21)	0.26		0.00	0.859	0.03	0.49	-0.01	0.16
	PM_{coarse} (µg/m^3)	-1.64	(-2.84, -0.43)	**0.01**	A	0.04	0.39	0.01	0.87	0.00	0.78	-0.80	(-2.03, 0.43)	0.20		0.08	0.11	B 0.06	0.17	-0.02	0.30	-1.23	(-2.25, -0.22)	**0.02**	A	0.056	0.153	0.03	0.37	-0.01	0.62

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

Exlusion of ID53

Table S12: Stability analysis for associations between respiratory outcomes, physical activity, pollutants and pre-exposure assessed using mixed effects models with continous covariates (ID53 excluded)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3	
	Estimate SP	Coeff.	95% CI	p		Coeff	p	Coeff	p	Coeff.	p	Coeff.	95% CI	p		Coeff.	p	Coef	p	Coeff	p	Coeff.	95% CI	p		Coeff	p	Coeff.	p	Coef	p
PEF (L/min)	NO_x (ppm)	-3.82	(-22.4, 14.8)	0.68		1.16	0.22	0.001	0.91	0.43	0.30	13.64	(-0.08, 27.36)	**0.05**	E	-0.93	0.18	0.01	0.56	-0.13	0.67	8.51	(-4.0, 21.0)	0.18		-0.34	0.59	0.004	0.59	0.03	0.93
	NO (ppm)	-3.61	(-24.6, 17.4)	0.73		1.29	0.24	0.001	0.93	0.49	0.34	13.67	(-1.88, 29.21)	**0.08**		-1.33	**0.10**	0.01	0.51	-0.26	0.50	8.52	(-5.6, 22.7)	0.23		-0.59	0.42	0.005	0.55	-0.05	0.90
	BC (10*µg/m^3)	-0.15	(-5.10, 4.80)	0.95		0.37	0.16	0.001	0.94	0.16	0.18	3.22	(-0.45, 6.88)	**0.08**		-0.25	0.21	0.01	0.50	-0.12	0.18	2.2	(-1.1, 5.6)	0.18		-0.07	0.69	0.005	0.55	-0.04	0.63
	UFP (10^5*cm^{-3})	-0.11	(-1.07, 0.85)	0.82		0.06	0.24	0.001	0.93	0.02	0.37	0.57	(-0.14, 1.28)	0.12		-0.05	0.14	0.01	0.50	-0.01	0.41	0.37	(-0.28, 1.01)	0.26		-0.02	0.50	0.005	0.55	0.00	0.80
	$PM_{2.5}$ (µg/m^3)	-0.03	(-0.31, 0.24)	0.81		0.02	**0.07**	0.001	0.92	0.009	**0.09**	0.17	(-0.04, 0.37)	0.11		-0.004	0.64	0.01	0.53	0.00	0.25	0.11	(-0.08, 0.30)	0.24		0.004	0.66	0.005	0.57	0.00	0.91
	PM_{10} (µg/m^3)	-0.03	(-0.20, 0.14)	0.72	B	0.02	**0.03**	0.002	0.90	0.008	**0.01**	0.05	(-0.08, 0.18)	0.44		0.000	1.00	0.01	0.51	0.00	0.16	0.03	(-0.09, 0.15)	0.61		0.00	0.32	0.005	0.56	0.00	0.83
	PM_{coarse} (µg/m^3)	-0.06	(-0.42, 0.31)	0.76	C	0.03	**0.03**	0.002	0.90	0.013	**0.01**	-0.07	(-0.34, 0.21)	0.64		0.01	0.50	0.01	0.41	0.00	0.31	-0.05	(-0.30, 0.20)	0.70		0.01	0.14	0.006	0.48	0.00	0.56
FEV_1 (mL)	NO_x (ppm)	-34.6	(-95.1, 25.9)	0.26		-0.51	0.87	-0.04	0.30	0.46	0.74	29.5	(-36.7, 95.7)	0.38		0.85	0.80	0.01	0.78	0.01	0.99	-8.0	(-62.2, 46.1)	0.77		0.04	0.99	-0.02	0.57	0.29	0.82
	NO (ppm)	-32	(-100.4, 36.3)	0.35		0.11	0.98	-0.04	0.28	0.62	0.71	31.9	(-42.8, 106.5)	0.40		0.78	0.84	0.01	0.76	-0.39	0.83	-5.4	(-66.4, 55.7)	0.86		0.39	0.90	-0.02	0.57	0.21	0.89
	BC (10*µg/m^3)	-5.85	(-22.0, 10.3)	0.47		-0.35	0.69	-0.04	0.27	0.33	0.38	8.37	(-9.2, 26.0)	0.35		0.04	0.96	0.01	0.75	-0.29	0.49	0.2	(-14.2, 14.6)	0.98		-0.20	0.80	-0.02	0.56	0.07	0.83
	UFP (10^5*cm^{-3})	-1.28	(-4.41, 1.85)	0.42		0.01	0.96	-0.04	0.27	0.01	0.86	1.65	(-1.76, 5.06)	0.34		-0.03	0.87	0.01	0.76	-0.05	0.49	-0.05	(-2.84, 2.74)	0.97		-0.01	0.95	-0.02	0.56	-0.02	0.81
	$PM_{2.5}$ (µg/m^3)	-0.56	(-1.46, 0.34)	0.22		-0.03	0.50	-0.04	0.30	0.00	0.97	0.33	(-0.66, 1.32)	0.51		0.00	0.99	0.01	0.76	-0.01	0.53	-0.19	(-1.00, 0.61)	0.63		-0.02	0.64	-0.02	0.58	0.00	0.76
	PM_{10} (µg/m^3)	-0.53	(-1.08, 0.02)	**0.06**		-0.01	0.74	-0.04	0.35	0.00	0.63	-0.094	(-0.71, 0.52)	0.76		0.01	0.73	0.02	0.69	-0.01	0.35	-0.36	(-0.85, 0.14)	0.16		-0.002	0.93	-0.02	0.66	0.00	0.86
	PM_{coarse} (µg/m^3)	-1.39	(-2.56, -0.23)	**0.02**	A	0.008	0.86	-0.03	0.40	0.02	0.26	-1.00	(-2.29, 0.30)	0.13		0.04	0.39	0.02	0.56	-0.01	0.53	-1.22	(-2.26, -0.19)	**0.02**	A	0.02	0.61	-0.01	0.78	0.01	0.68
FEV_1/FVC (%)	NO_x (ppm)	-0.37	(-1.04, 0.30)	0.27		0.002	0.94	-0.001	**0.07**	0.03	**0.09**	-0.052	(-0.82, 0.71)	0.89		-0.02	0.69	0.00	0.39	0.01	0.47	-0.239	(-0.81, 0.33)	0.41		-0.005	0.88	-0.001	**0.08**	0.02	0.12
	NO (ppm)	-0.51	(-1.27, 0.24)	0.18		0.015	0.71	-0.001	**0.06**	0.03	**0.09**	-0.055	(-0.92, 0.81)	0.90		-0.02	0.66	0.00	0.39	0.01	0.53	-0.325	(-0.97, 0.32)	0.32		0.002	0.96	-0.001	**0.08**	0.02	0.13
	BC (10*µg/m^3)	-0.08	(-0.26, 0.10)	0.38		0.002	0.83	-0.001	**0.06**	0.011	**0.01**	0.006	(-0.20, 0.21)	0.95		-0.01	0.52	0.00	0.38	0.00	0.75	-0.042	(-0.19, 0.11)	0.59		-0.002	0.84	-0.001	**0.07**	0.01	**0.04**
	UFP (10^5*cm^{-3})	-0.02	(-0.06, 0.01)	0.20		0.000	0.80	-0.001	**0.06**	0.002	**0.05**	-0.004	(-0.04, 0.04)	0.86		-0.002	0.42	0.00	0.39	0.00	0.61	-0.015	(-0.04, 0.01)	0.33		0.000	0.80	-0.001	**0.08**	0.00	0.11
	$PM_{2.5}$ (µg/m^3)	-0.003	(-0.01, 0.01)	0.54		0.000	0.83	-0.001	**0.06**	0.0004	**0.05**	0.000	(-0.01, 0.01)	0.94		0.000	0.38	0.00	0.39	0.00	0.45	-0.002	(-0.01, 0.01)	0.70		0.000	0.53	-0.001	**0.08**	0.00	**0.08**
	PM_{10} (µg/m^3)	-0.001	(-0.01, 0.01)	0.87		0.000	0.72	-0.001	**0.06**	0.0002	**0.04**	-0.001	(-0.01, 0.01)	0.79		0.000	0.34	0.00	0.40	0.00	0.61	0.00	(-0.01, 0.00)	0.88		0.000	0.44	-0.001	**0.07**	0.00	**0.09**
	PM_{coarse} (µg/m^3)	0.004	(-0.01, 0.02)	0.55		0.000	0.57	-0.001	**0.04**	0.00	0.17	-0.003	(-0.02, 0.01)	0.66		-0.001	0.39	0.00	0.42	0.00	0.80	0.00	(-0.01, 0.01)	0.77		0.000	0.38	-0.001	**0.06**	0.00	0.29
FVC (mL)	NO_x (ppm)	-15.3	(-83.7, 53.2)	0.66		-0.78	0.82	-0.01	0.81	-0.65	0.68	29.2	(-36.7, 95.1)	0.38		0.403	0.90	0.04	0.31	-0.86	0.57	8.5	(-48.7, 65.7)	0.77		-0.18	0.95	0.02	0.63	-0.74	0.57
	NO (ppm)	-5.41	(-82.7, 71.9)	0.89		-0.83	0.84	-0.01	0.78	-0.78	0.68	32.5	(-41.8, 106.8)	0.39		0.154	0.97	0.04	0.30	-1.52	0.40	14.9	(-49.5, 79.3)	0.65		-0.32	0.92	0.02	0.62	-1.16	0.46
	BC (10*µg/m^3)	-1.7	(-19.9, 16.5)	0.85		-0.54	0.59	-0.01	0.79	-0.13	0.77	6.86	(-10.7, 24.4)	0.44		0.032	0.97	0.04	0.29	-0.51	0.22	2.9	(-12.3, 18.1)	0.71		-0.25	0.76	0.02	0.62	-0.34	0.35
	UFP (10^5*cm^{-3})	-0.06	(-3.60, 3.47)	0.97		-0.03	0.85	-0.01	0.78	-0.05	0.50	1.76	(-1.63, 5.15)	0.31		-0.033	0.85	0.04	0.30	-0.11	0.17	0.91	(-2.03, 3.85)	0.54		-0.03	0.82	0.02	0.63	-0.08	0.22
	$PM_{2.5}$ (µg/m^3)	-0.4	(-1.42, 0.62)	0.43		-0.02	0.62	-0.01	0.83	-0.02	0.36	0.28	(-0.70, 1.27)	0.57		0.007	0.88	0.04	0.30	-0.02	0.18	-0.04	(-0.89, 0.81)	0.92		-0.01	0.83	0.02	0.61	-0.02	0.17
	PM_{10} (µg/m^3)	-0.56	(-1.18, 0.06)	**0.08**		0.01	0.81	0.00	0.95	0.00	0.67	-0.14	(-0.75, 0.47)	0.65		0.021	0.41	0.05	0.25	-0.02	0.11	-0.34	(-0.87, 0.18)	0.19		0.01	0.55	0.02	0.51	-0.01	0.21
	PM_{coarse} (µg/m^3)	-1.81	(-3.10, -0.51)	**0.01**	A	0.06	0.24	0.00	0.92	0.01	0.54	-1.13	(-2.42, 0.15)	**0.08**		0.08	0.10	B 0.06	0.17	-0.02	0.31	-1.47	(-2.55, -0.38)	**0.01**	A	0.068	**0.10**	0.03	0.37	0.00	0.76

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

Exclusion of ID65

Table S13: Stability analysis for associations between respiratory outcomes, physical activity, pollutants and pre-exposure assessed using mixed effects models with continous covariates (ID65 excluded)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1				IA1			IA2			IA3				CO1				IA1			IA2			IA3				CO1				IA1			IA2			IA3		
	Estimate SP	Coeff.	95% CI	p		Coeff	p		Coeff	p		Coeff.	p			Coeff.	95% CI	p		Coeff.	p		Coef	p		Coeff	p			Coeff.	95% CI	p		Coeff	p		Coeff.	p		Coef	p	
PEF (L/min)	NO_x (ppm)	-1.24	(-19.4, 17.0)	0.89		1.25	0.17		0.000	0.99		0.33	0.42			15.96	(2.3, 29.6)	**0.02**	E	-1.06	0.12		0.00	0.71		-0.25	0.42			7.40	(-5.2, 20.0)	0.25		0.11	0.86		0.00	0.83		0.04	0.89	
	NO (ppm)	-0.61	(-21.2, 20.0)	0.95		1.44	0.17		0.000	0.99		0.35	0.48			17.41	(2.0, 32.8)	**0.03**		-1.50	**0.06**		0.00	0.64		-0.37	0.32			8.44	(-5.8, 22.7)	0.24		-0.01	0.99		0.00	0.80		-0.02	0.96	
	BC (10*µg/m^3)	0.479	(-4.3, 5.3)	0.84		0.39	0.13		0.000	0.97		0.12	0.29			3.87	(0.3, 7.5)	**0.04**		-0.30	0.11		0.00	0.63		-0.15	**0.07**			2.2	(-1.13, 5.54)	0.19		0.04	0.80		0.00	0.80		-0.02	0.84	
	UFP (10^5*cm^{-3})	0.022	(-0.92, 0.96)	0.96		0.06	0.20		0.000	0.98		0.01	0.52			0.74	(0.03, 1.44)	**0.04**		-0.07	**0.06**		0.00	0.63		-0.02	0.24			0.38	(-0.27, 1.03)	0.25		0.00	0.95		0.00	0.79		0.00	0.86	
	$PM_{2.5}$ (µg/m^3)	-0.01	(-0.28, 0.25)	0.91		0.02	**0.07**	B	0.000	0.99		0.007	0.12			0.18	(-0.02, 0.38)	**0.08**		-0.01	0.36		0.00	0.67		-0.01	0.11			0.09	(-0.10, 0.27)	0.35		0.007	0.42		0.00	0.81		0.00	0.82	
	PM_{10} (µg/m^3)	-0.03	(-0.18, 0.13)	0.75		0.01	**0.03**		0.000	0.98		0.007	**0.01**	C		0.06	(-0.07, 0.18)	0.36		0.00	0.72		0.00	0.64		0.00	**0.08**			0.02	(-0.09, 0.13)	0.71		0.01	0.20		0.00	0.78		0.00	0.37	
	PM_{coarse} (µg/m^3)	-0.07	(-0.41, 0.27)	0.67		0.03	**0.03**		0.001	0.96		0.013	**0.004**			-0.05	(-0.31, 0.22)	0.73		0.01	0.61		0.01	0.51		0.00	0.24			-0.05	(-0.28, 0.19)	0.70		0.02	**0.09**		0.00	0.69		0.00	0.17	
FEV_1 (mL)	NO_x (ppm)	-28.4	(-86.7, 29.9)	0.34		-1.66	0.57		-0.04	0.29		0.06	0.97			37.2	(-29.8, 104.1)	0.27		0.68	0.84		0.01	0.78		0.03	0.98			4.4	(-50.1, 58.8)	0.87		-0.49	0.86		-0.01	0.69		0.07	0.95	
	NO (ppm)	-23.8	(-89.9, 42.3)	0.48		-1.44	0.67		-0.04	0.27		0.13	0.94			41.5	(-34.3, 117.2)	0.28		0.53	0.89		0.01	0.75		-0.35	0.85			8.8	(-52.7, 70.4)	0.78		-0.45	0.89		-0.01	0.69		-0.09	0.95	
	BC (10*µg/m^3)	-4.63	(-20.1, 10.9)	0.55		-0.65	0.43		-0.04	0.26		0.23	0.52			10.72	(-7.0, 28.4)	0.23		-0.02	0.98		0.01	0.75		-0.29	0.49			3.0	(-11.3, 17.4)	0.67		-0.35	0.651		-0.01	0.68		-0.03	0.94	
	UFP (10^5*cm^{-3})	-0.76	(-3.77, 2.26)	0.62		-0.07	0.63		-0.04	0.26		-0.01	0.84			2.02	(-1.42, 5.47)	0.25		-0.04	0.80		0.01	0.74		-0.05	0.51			0.63	(-2.17, 3.43)	0.66		-0.06	0.677		-0.01	0.68		-0.03	0.62	
	$PM_{2.5}$ (µg/m^3)	-0.47	(-1.31, 0.38)	0.28		-0.04	0.29		-0.04	0.29		0.00	0.84			0.45	(-0.52, 1.43)	0.36		0.00	0.94		0.01	0.76		-0.01	0.54			-0.01	(-0.80, 0.78)	0.98		-0.02	0.534		-0.01	0.70		-0.01	0.62	
	PM_{10} (µg/m^3)	-0.47	(-0.97, 0.04)	**0.07**		-0.01	0.54		-0.03	0.35		0.00	0.73			0.010	(-0.58, 0.60)	0.97		0.01	0.79		0.02	0.70		-0.01	0.37			-0.23	(-0.70, 0.25)	0.35		-0.004	0.850		-0.01	0.80		0.00	0.69	
	PM_{coarse} (µg/m^3)	-1.28	(-2.34, -0.22)	**0.02**	A	0.003	0.94		-0.03	0.41		0.02	0.26			-0.70	(-1.96, 0.55)	0.27		0.04	0.42		0.02	0.56		-0.01	0.52			-0.99	(-1.98, 0.01)	**0.05**	A	0.02	0.61		0.00	0.93		0.00	0.87	
FEV_1/FVC (%)	NO_x (ppm)	-0.32	(-0.99, 0.36)	0.36		0.01	0.82		-0.001	**0.09**	D	0.03	**0.08**			-0.006	(-0.79, 0.78)	0.99		-0.02	0.54		0.00	0.42		0.01	0.50			-0.164	(-0.75, 0.42)	0.58		-0.008	0.79		-0.001	0.13	D	0.02	0.14	
	NO (ppm)	-0.48	(-1.24, 0.28)	0.22		0.02	0.62		-0.001	**0.09**		0.03	**0.08**			-0.009	(-0.89, 0.87)	0.98		-0.03	0.51		0.00	0.42		0.01	0.56			-0.247	(-0.91, 0.41)	0.46		-0.005	0.88		-0.001	0.13		0.02	0.17	
	BC (10*µg/m^3)	-0.07	(-0.25, 0.11)	0.46		0.004	0.66		-0.001	**0.08**		0.011	**0.01**	C		0.018	(-0.19, 0.22)	0.86		-0.01	0.40		0.00	0.42		0.00	0.75			-0.025	(-0.18, 0.13)	0.75		-0.002	0.77		-0.001	0.12		0.01	**0.07**	C
	UFP (10^5*cm^{-3})	-0.02	(-0.05, 0.02)	0.27		0.001	0.71		-0.001	**0.08**		0.002	**0.05**			-0.001	(-0.04, 0.04)	0.94		0.00	0.30		0.00	0.43		0.00	0.64			-0.011	(-0.04, 0.02)	0.49		-0.001	0.64		-0.001	0.13		0.00	0.15	
	$PM_{2.5}$ (µg/m^3)	-0.002	(-0.01, 0.01)	0.69		0.000	0.97		-0.001	**0.08**		0.0004	**0.03**			0.001	(-0.01, 0.01)	0.92		0.00	0.31		0.00	0.42		0.00	0.48			-0.001	(-0.01, 0.01)	0.89		0.000	0.52		-0.001	0.12		0.00	**0.08**	
	PM_{10} (µg/m^3)	0.000	(-0.01, 0.01)	1.00		0.000	0.92		-0.001	**0.07**		0.0002	**0.02**			0.000	(-0.01, 0.01)	0.97		0.00	0.26		0.00	0.42		0.00	0.64			0.00	(-0.01, 0.01)	0.99		0.000	0.42		-0.001	0.11		0.00	**0.10**	
	PM_{coarse} (µg/m^3)	0.004	(-0.01, 0.02)	0.51		0.000	0.69		-0.001	**0.06**		0.00	0.11			-0.001	(-0.02, 0.01)	0.84		0.00	0.30		0.00	0.44		0.00	0.86			0.00	(-0.01, 0.01)	0.77		0.000	0.36		-0.001	0.10		0.00	0.29	
FVC (mL)	NO_x (ppm)	-9.26	(-77.0, 58.5)	0.79		-2.39	0.48		-0.01	0.76		-1.23	0.42			36.9	(-29.3, 103.2)	0.27		0.57	0.863		0.04	0.32		-0.76	0.61			13.9	(-43.7, 71.5)	0.63		-0.91	0.753		0.01	0.71		-0.96	0.46	
	NO (ppm)	4.335	(-72.4, 81.0)	0.91		-2.83	0.47		-0.01	0.73		-1.44	0.44			42.7	(-32.2, 117.7)	0.26		0.304	0.937		0.04	0.30		-1.39	0.44			23.5	(-41.5, 88.6)	0.47		-1.26	0.708		0.01	0.70		-1.39	0.38	
	BC (10*µg/m^3)	-0.47	(-18.4, 17.5)	0.96		-1.01	0.29		-0.01	0.74		-0.28	0.50			9.41	(-8.1, 27.0)	0.29		0.045	0.96		0.04	0.30		-0.49	0.23			4.5	(-10.8, 19.7)	0.56		-0.49	0.542		0.01	0.70		-0.39	0.27	
	UFP (10^5*cm^{-3})	0.463	(-3.03, 3.95)	0.79		-0.14	0.43		-0.02	0.72		-0.09	0.26			2.13	(-1.27, 5.54)	0.22		-0.029	0.87		0.04	0.30		-0.10	0.20			1.29	(-1.66, 4.24)	0.39		-0.08	0.577		0.01	0.71		-0.09	0.16	
	$PM_{2.5}$ (µg/m^3)	-0.34	(-1.32, 0.64)	0.49		-0.04	0.31		-0.01	0.78		-0.02	0.19			0.40	(-0.56, 1.37)	0.41		0.007	0.88		0.04	0.30		-0.02	0.19			0.03	(-0.81, 0.87)	0.95		-0.02	0.6		0.02	0.67		-0.02	0.12	
	PM_{10} (µg/m^3)	-0.5	(-1.09, 0.08)	**0.09**		-0.01	0.82		0.00	0.91		-0.01	0.45			-0.03	(-0.62, 0.55)	0.91		0.02	0.41		0.05	0.26		-0.02	0.13			-0.27	(-0.78, 0.23)	0.29		0.01	0.752		0.02	0.56		-0.01	0.17	
	PM_{coarse} (µg/m^3)	-1.69	(-2.90, -0.48)	**0.01**	A	0.04	0.37		0.00	0.94		0.01	0.68			-0.83	(-2.06, 0.41)	0.19		0.081	**0.10**	B	0.06	0.18		-0.02	0.32			-1.26	(-2.30, -0.22)	**0.02**	A	0.06	0.143		0.03	0.41		-0.01	0.69	

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% CI for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

9) Stability analysis: Excluding outliers

The identification of outliers is described in the supplemental material, Part 7. Estimates and interaction terms that turned statistically significant in the stability analysis compared with the general analysis are marked in green, whereas estimates and interaction terms that turned statistically insignificant compared to the general analysis are marked in orange.

Exclusion of measurements being an outlier for at least two respiratory outcomes

Table S14: Stability analysis for associations between respiratory outcomes, physical activity, pollutants and pre-exposure assessed using mixed effects models with continous covariates (Exclusion of multiple outliers)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3	
	Estimate SP	Coeff.	95% CI	p		Coeff	p	Coeff	p	Coeff.	p	Coeff.	95% CI	p		Coeff	p	Coef	p	Coeff	p	Coeff.	95% CI	p		Coeff	p	Coeff.	p	Coef	p
PEF (L/min)	NO_x (ppm)	-4.85	(-23.4, 13.7)	0.60		1.29	0.17	0.002	0.90	0.43	0.30	11.96	(-0.82, 24.73)	**0.07**	E	-0.79	0.22	0.00	0.58	-0.29	0.31	3.22	(-9.5, 16.0)	0.62		0.36	0.58	0.00	0.75	0.09	0.75
	NO (ppm)	-5.24	(-26.1, 15.6)	0.62		1.47	0.17	0.001	0.91	0.48	0.35	13.13	(-1.35, 27.61)	**0.07**		-1.12	0.14	0.01	0.52	-0.40	0.25	3.53	(-10.8, 17.9)	0.63		0.31	0.68	0.00	0.73	0.06	0.87
	BC (10*µg/m^3)	-0.53	(-5.45, 4.40)	0.83		0.42	0.11	0.001	0.93	0.16	0.18	3.00	(-0.41, 6.41)	**0.08**		-0.19	0.29	0.01	0.53	-0.16	**0.05**	1.2	(-2.2, 4.6)	0.49		0.15	0.41	0.00	0.74	0.01	0.90
	UFP (10^5*cm^{-3})	-0.18	(-1.14, 0.77)	0.71		0.07	0.18	0.001	0.92	0.02	0.38	0.55	(-0.11, 1.22)	**0.10**		-0.05	0.18	0.01	0.52	-0.02	0.23	0.17	(-0.49, 0.83)	0.61		0.02	0.63	0.00	0.73	0.00	0.90
	$PM_{2.5}$ (µg/m^3)	-0.05	(-0.33, 0.22)	0.70		0.03	**0.04**	0.001	0.91	0.009	**0.08**	0.13	(-0.06, 0.32)	0.17		0.00	0.76	0.00	0.55	-0.01	**0.07**	0.04	(-0.15, 0.23)	0.70		0.013	0.14	0.00	0.74	0.00	0.59
	PM_{10} (µg/m^3)	-0.05	(-0.21, 0.12)	0.59		0.02	**0.02**	0.002	0.88	0.008	**0.01**	0.04	(-0.07, 0.16)	0.46		0.00	0.76	0.01	0.52	0.00	**0.05**	0.00	(-0.11, 0.12)	0.98		0.01	**0.04**	0.00	0.71	0.00	0.22
	PM_{coarse} (µg/m^3)	-0.09	(-0.45, 0.27)	0.62		0.03	**0.02**	0.002	0.87	0.014	**0.004**	-0.04	(-0.30, 0.22)	0.75		0.01	0.28	0.01	0.40	0.00	0.20	-0.05	(-0.29, 0.20)	0.70		0.02	**0.02**	0.00	0.66	0.01	0.11
FEV$_1$ (mL)	NO_x (ppm)	-35.9	(-94.9, 23.1)	0.23		-0.29	0.92	-0.04	0.26	0.45	0.74	26.9	(-32.5, 86.2)	0.37		2.29	0.45	0.01	0.73	-0.38	0.78	-3.5	(-53.2, 46.1)	0.89		1.03	0.68	-0.01	0.66	0.07	0.95
	NO (ppm)	-31.9	(-98.5, 34.6)	0.34		0.19	0.96	-0.04	0.24	0.64	0.70	33.2	(-33.9, 100.4)	0.33		3.04	0.39	0.01	0.71	-0.66	0.68	1.8	(-54.2, 57.8)	0.95		1.62	0.58	-0.01	0.65	0.04	0.98
	BC (10*µg/m^3)	-6.21	(-22.0, 9.5)	0.43		-0.19	0.83	-0.05	0.23	0.34	0.36	8.94	(-6.8, 24.7)	0.26		0.69	0.42	0.01	0.72	-0.33	0.38	1.6	(-11.5, 14.8)	0.81		0.25	0.73	-0.01	0.64	0.02	0.95
	UFP (10^5*cm^{-3})	-1.33	(-4.38, 1.72)	0.39		0.02	0.91	-0.04	0.24	0.01	0.84	1.80	(-1.26, 4.87)	0.24		0.07	0.67	0.01	0.72	-0.06	0.40	0.29	(-2.27, 2.85)	0.82		0.04	0.74	-0.01	0.64	-0.02	0.74
	$PM_{2.5}$ (µg/m^3)	-0.65	(-1.53, 0.23)	0.15		-0.01	0.80	-0.04	0.26	0.00	0.88	0.34	(-0.54, 1.22)	0.45		0.03	0.52	0.01	0.72	-0.01	0.40	-0.13	(-0.86, 0.61)	0.73		0.01	0.83	-0.01	0.68	-0.01	0.68
	PM_{10} (µg/m^3)	-0.57	(-1.10, -0.04)	**0.04**		0.00	0.89	-0.04	0.32	0.01	0.53	0.001	(-0.54, 0.55)	1.00		0.02	0.30	0.02	0.65	-0.01	0.29	-0.26	(-0.70, 0.19)	0.25		0.013	0.49	-0.01	0.77	0.00	0.80
	PM_{coarse} (µg/m^3)	-1.42	(-2.54, -0.30)	**0.01**	A	0.027	0.55	-0.03	0.37	0.02	0.21	-0.64	(-1.81, 0.53)	0.28		0.07	0.13	0.03	0.49	-0.01	0.52	-0.95	(-1.88, -0.01)	**0.05**	A	0.05	0.21	0.00	0.89	0.00	0.74
FEV$_1$/FVC (%)	NO_x (ppm)	-0.4	(-1.07, 0.27)	0.24		0.01	0.72	-0.001	**0.08**	0.03	**0.07**	-0.106	(-0.83, 0.62)	0.77		-0.01	0.70	0.00	0.42	0.01	0.66	-0.226	(-0.75, 0.30)	0.40		0.000	1.00	-0.001	0.12	0.02	0.15
	NO (ppm)	-0.56	(-1.31, 0.18)	0.14		0.03	0.52	-0.001	**0.08**	0.03	**0.07**	-0.105	(-0.93, 0.72)	0.80		-0.02	0.69	0.00	0.42	0.01	0.72	-0.298	(-0.89, 0.30)	0.32		0.005	0.86	-0.001	0.11	0.02	0.16
	BC (10*µg/m^3)	-0.09	(-0.27, 0.09)	0.32		0.01	0.51	-0.001	**0.07**	0.012	**0.004**	-0.002	(-0.20, 0.19)	0.98		-0.01	0.60	0.00	0.41	0.00	0.92	-0.038	(-0.18, 0.10)	0.59		0.001	0.91	-0.001	0.11	0.01	**0.07**
	UFP (10^5*cm^{-3})	-0.02	(-0.06, 0.01)	0.15		0.00	0.57	-0.001	**0.08**	0.002	**0.04**	-0.005	(-0.04, 0.03)	0.79		0.00	0.40	0.00	0.42	0.00	0.75	-0.013	(-0.04, 0.01)	0.33		0.000	0.86	-0.001	0.11	0.00	0.13
	$PM_{2.5}$ (µg/m^3)	-0.004	(-0.01, 0.01)	0.45		0.00	0.69	-0.001	**0.08**	0.0004	**0.03**	-0.001	(-0.01, 0.01)	0.87		0.00	0.47	0.00	0.42	0.00	0.57	-0.002	(-0.01, 0.01)	0.64		0.000	0.87	-0.001	0.11	0.00	**0.08**
	PM_{10} (µg/m^3)	-0.001	(-0.01, 0.01)	0.75		0.00	0.86	-0.001	**0.07**	0.0003	**0.02**	-0.001	(-0.01, 0.01)	0.88		0.00	0.40	0.00	0.42	0.00	0.69	0.00	(-0.01, 0.00)	0.86		0.000	0.71	-0.001	0.10	0.00	**0.09**
	PM_{coarse} (µg/m^3)	0.003	(-0.01, 0.02)	0.65		0.00	0.83	-0.001	**0.05**	0.00	0.11	-0.001	(-0.02, 0.01)	0.88		0.00	0.43	0.00	0.42	0.00	0.87	0.00	(-0.01, 0.01)	0.76		0.000	0.56	-0.001	**0.09**	0.00	0.28
FVC (mL)	NO_x (ppm)	-15.9	(-83.3, 51.6)	0.64		-0.91	0.79	-0.02	0.73	-0.74	0.63	28.1	(-32.1, 88.3)	0.36		2.27	0.46	0.04	0.29	-1.02	0.46	5.9	(-48.0, 59.9)	0.83		0.59	0.83	0.01	0.70	-0.86	0.48
	NO (ppm)	-3.18	(-79.1, 72.7)	0.93		-1.15	0.77	-0.02	0.70	-0.81	0.67	36.0	(-32.1, 104.1)	0.30		2.94	0.41	0.04	0.28	-1.51	0.36	15.8	(-44.9, 76.4)	0.61		0.76	0.81	0.01	0.71	-1.15	0.44
	BC (10*µg/m^3)	-1.71	(-19.6, 16.2)	0.85		-0.52	0.60	-0.02	0.70	-0.14	0.74	8.01	(-8.0, 24.0)	0.32		0.79	0.36	0.04	0.28	-0.47	0.21	3.0	(-11.2, 17.3)	0.67		0.09	0.91	0.01	0.70	-0.30	0.38
	UFP (10^5*cm^{-3})	-0.03	(-3.50, 3.45)	0.99		-0.04	0.80	-0.02	0.70	-0.06	0.49	2.00	(-1.10, 5.11)	0.20		0.09	0.57	0.04	0.29	-0.10	0.16	0.97	(-1.81, 3.74)	0.49		0.02	0.9	0.01	0.71	-0.08	0.23
	$PM_{2.5}$ (µg/m^3)	-0.48	(-1.49, 0.52)	0.34		-0.01	0.78	-0.01	0.76	-0.02	0.35	0.33	(-0.56, 1.22)	0.46		0.04	0.37	0.04	0.29	-0.02	0.16	-0.06	(-0.86, 0.73)	0.87		0.01	0.82	0.01	0.67	-0.02	0.17
	PM_{10} (µg/m^3)	-0.59	(-1.19, 0.02)	**0.06**		0.01	0.58	-0.01	0.88	0.00	0.67	-0.03	(-0.58, 0.52)	0.91		0.04	0.10	0.05	0.24	-0.02	0.12	-0.29	(-0.77, 0.19)	0.24		0.02	0.25	0.02	0.56	-0.01	0.26
	PM_{coarse} (µg/m^3)	-1.8	(-3.06, -0.55)	**0.01**	A	0.08	0.13	0.00	0.99	0.01	0.55	-0.76	(-1.94, 0.43)	0.21		0.11	**0.02**	B	0.06	0.15	-0.01	0.37	-1.21	(-2.21, -0.20)	**0.02**	A	0.087	**0.03**	0.03	0.41	0.00	0.89

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

Exclusion of FEV1/FVC outliers

Table S15: Stability analysis for associations between respiratory outcomes, physical activity, pollutants and pre-exposure assessed using mixed effects models with continous covariates (Exclusion of FEV_1/FVC outliers)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3	
	Estimate SP	Coeff.	95% CI	p		Coeff	p	Coeff	p	Coeff.	p	Coeff.	95% CI	p		Coeff.	p	Coef	p	Coeff	p	Coeff.	95% CI	p		Coeff	p	Coeff.	p	Coef	p
PEF (L/min)	NO_x (ppm)	-3.99	(-23.5, 15.6)	0.69		1.38	0.18	0.001	0.93	0.42	0.34	13.59	(0.1, 27.1)	**0.05**	E	-0.98	0.15	0.00	0.67	-0.17	0.57	5.29	(-8.0, 18.6)	0.43		-0.01	0.99	0.00	0.71	0.13	0.67
	NO (ppm)	-3.57	(-25.8, 18.7)	0.75		1.64	0.18	0.001	0.95	0.51	0.34	14.31	(-0.9, 29.6)	**0.07**		-1.39	**0.08**	0.00	0.61	-0.28	0.46	5.96	(-9.1, 21.0)	0.43		-0.20	0.81	0.00	0.68	0.13	0.72
	BC (10*µg/m^3)	-0.1	(-5.4, 5.2)	0.97		0.46	0.13	0.001	0.97	0.15	0.21	3.26	(-0.32, 6.84)	**0.07**		-0.28	0.15	0.00	0.61	-0.13	0.13	1.7	(-1.8, 5.3)	0.33		0.02	0.92	0.00	0.69	0.02	0.85
	UFP (10^5*cm^{-3})	-0.13	(-1.15, 0.88)	0.79		0.08	0.17	0.001	0.95	0.02	0.35	0.59	(-0.11, 1.29)	**0.10**		-0.06	0.11	0.00	0.60	-0.01	0.38	0.25	(-0.44, 0.94)	0.48		-0.01	0.87	0.00	0.68	0.00	0.78
	$PM_{2.5}$ (µg/m^3)	-0.05	(-0.34, 0.24)	0.74		0.03	**0.040**	0.001	0.94	0.008	0.11	0.15	(-0.05, 0.35)	0.13		-0.01	0.45	0.00	0.64	-0.01	0.16	0.06	(-0.14, 0.26)	0.54		0.008	0.39	0.00	0.70	0.00	0.62
	PM_{10} (µg/m^3)	-0.04	(-0.22, 0.14)	0.65		0.02	**0.02**	0.002	0.91	0.008	**0.01**	0.05	(-0.08, 0.17)	0.46		0.00	0.82	0.00	0.61	0.00	0.11	0.01	(-0.11, 0.13)	0.87		0.01	0.15	0.00	0.66	0.00	0.30
	PM_{coarse} (µg/m^3)	-0.07	(-0.44, 0.30)	0.70		0.04	**0.02**	0.002	0.91	0.013	**0.01**	-0.05	(-0.32, 0.21)	0.69		0.01	0.57	0.01	0.50	0.00	0.25	-0.05	(-0.30, 0.21)	0.70		0.02	**0.06**	0.00	0.60	0.00	0.19
FEV_1 (mL)	NO_x (ppm)	-41.6	(-103.6, 20.4)	0.19		-0.26	0.94	-0.04	0.30	0.54	0.70	34.6	(-30.0, 99.1)	0.29		0.41	0.90	0.01	0.76	0.07	0.96	-0.9	(-54.5, 52.7)	0.97		-0.39	0.89	-0.01	0.77	0.18	0.88
	NO (ppm)	-39.2	(-110.1, 31.7)	0.27		0.45	0.91	-0.04	0.27	0.84	0.62	37.8	(-34.9, 110.4)	0.30		0.17	0.96	0.01	0.72	-0.30	0.87	3.0	(-57.5, 63.5)	0.92		-0.39	0.90	-0.01	0.76	0.11	0.94
	BC (10*µg/m^3)	-7.52	(-24.3, 9.3)	0.37		-0.14	0.89	-0.04	0.26	0.38	0.33	9.82	(-7.2, 26.8)	0.25		-0.08	0.93	0.01	0.73	-0.26	0.52	1.7	(-12.5, 16.0)	0.81		-0.26	0.74	-0.01	0.76	0.01	0.97
	UFP (10^5*cm^{-3})	-1.78	(-5.02, 1.46)	0.28		0.02	0.90	-0.04	0.27	0.03	0.69	1.91	(-1.40, 5.23)	0.25		-0.05	0.75	0.01	0.73	-0.05	0.51	0.28	(-2.48, 3.04)	0.84		-0.05	0.73	-0.01	0.76	-0.02	0.75
	$PM_{2.5}$ (µg/m^3)	-0.75	(-1.68, 0.17)	0.11		0.00	0.92	-0.04	0.32	0.00	0.85	0.43	(-0.52, 1.38)	0.37		0.00	0.91	0.01	0.75	-0.01	0.55	-0.12	(-0.91, 0.67)	0.77		-0.01	0.75	-0.01	0.79	-0.01	0.69
	PM_{10} (µg/m^3)	-0.64	(-1.19, -0.08)	**0.03**		0.01	0.69	-0.03	0.41	0.01	0.57	0.005	(-0.57, 0.58)	0.99		0.01	0.80	0.02	0.68	-0.01	0.37	-0.29	(-0.77, 0.18)	0.23		0.004	0.83	0.00	0.90	0.00	0.72
	PM_{coarse} (µg/m^3)	-1.5	(-2.66, -0.34)	**0.01**	A	0.041	0.39	-0.03	0.47	0.02	0.25	-0.71	(-1.93, 0.52)	0.26		0.04	0.42	0.03	0.55	-0.01	0.52	-1.09	(-2.09, -0.10)	**0.03**	A	0.04	0.35	0.00	0.95	0.00	0.86
FEV_1/FVC (%)	NO_x (ppm)	-0.31	(-0.98, 0.36)	0.35		0.01	0.86	-0.001	**0.08**	0.02	0.15	0.003	(-0.75, 0.76)	0.99		-0.02	0.55	0.00	0.42	0.01	0.49	-0.150	(-0.70, 0.40)	0.59		-0.010	0.73	-0.001	0.12	0.02	0.21
	NO (ppm)	-0.39	(-1.15, 0.36)	0.30		0.02	0.63	-0.001	**0.08**	0.03	**0.10**	0.002	(-0.84, 0.85)	1.00		-0.03	0.52	0.00	0.42	0.01	0.55	-0.194	(-0.82, 0.43)	0.54		-0.008	0.82	-0.001	0.12	0.02	0.20
	BC (10*µg/m^3)	-0.06	(-0.24, 0.12)	0.52		0.01	0.62	-0.001	**0.07**	0.011	**0.01**	0.020	(-0.18, 0.22)	0.84		-0.01	0.41	0.00	0.42	0.00	0.75	-0.020	(-0.17, 0.13)	0.79		-0.003	0.70	-0.001	0.12	0.01	**0.10**	C
	UFP (10^5*cm^{-3})	-0.02	(-0.05, 0.02)	0.31		0.00	0.62	-0.001	**0.08**	0.001	**0.07**	-0.001	(-0.04, 0.04)	0.96		0.00	0.31	0.00	0.42	0.00	0.63	-0.009	(-0.04, 0.02)	0.54		-0.001	0.63	-0.001	0.12	0.00	0.20
	$PM_{2.5}$ (µg/m^3)	-0.004	(-0.01, 0.01)	0.47		0.00	0.61	-0.001	**0.08**	0.0003	**0.08**	0.001	(-0.01, 0.01)	0.89		0.00	0.31	0.00	0.41	0.00	0.48	-0.001	(-0.01, 0.01)	0.76		0.000	0.64	-0.001	0.12	0.00	0.13
	PM_{10} (µg/m^3)	-0.001	(-0.01, 0.01)	0.76		0.00	0.69	-0.001	**0.07**	0.0002	**0.05**	0.000	(-0.01, 0.01)	0.99		0.00	0.26	0.00	0.42	0.00	0.66	0.00	(-0.01, 0.00)	0.82		0.000	0.56	-0.001	0.12	0.00	0.13
	PM_{coarse} (µg/m^3)	0.003	(-0.01, 0.02)	0.70		0.00	0.94	-0.001	**0.05**	0.00	0.13	-0.001	(-0.02, 0.01)	0.85		0.00	0.30	0.00	0.43	0.00	0.88	0.00	(-0.01, 0.01)	0.98		0.000	0.50	-0.001	0.11	0.00	0.29
FVC (mL)	NO_x (ppm)	-24.5	(-93.1, 44.2)	0.48		-1.07	0.77	-0.02	0.71	-0.24	0.88	33.9	(-30.2, 98.1)	0.30		0.163	0.96	0.04	0.30	-0.74	0.61	7.3	(-48.2, 62.7)	0.80		-0.93	0.74	0.02	0.60	-0.63	0.61
	NO (ppm)	-18	(-96.3, 60.3)	0.65		-1.27	0.77	-0.02	0.68	-0.33	0.86	38.5	(-33.7, 110.6)	0.29		-0.236	0.95	0.04	0.28	-1.35	0.45	14.4	(-48.1, 76.9)	0.65		-1.37	0.68	0.02	0.60	-0.96	0.53
	BC (10*µg/m^3)	-4.14	(-22.6, 14.3)	0.66		-0.62	0.57	-0.02	0.68	-0.02	0.96	8.39	(-8.6, 25.3)	0.33		-0.047	0.96	0.04	0.28	-0.46	0.25	2.8	(-11.9, 17.5)	0.70		-0.42	0.6	0.02	0.59	-0.29	0.40
	UFP (10^5*cm^{-3})	-0.84	(-4.41, 2.74)	0.64		-0.06	0.75	-0.02	0.68	-0.02	0.76	2.02	(-1.27, 5.31)	0.22		-0.048	0.78	0.04	0.29	-0.10	0.19	0.81	(-2.04, 3.67)	0.57		-0.09	0.55	0.02	0.60	-0.07	0.28
	$PM_{2.5}$ (µg/m^3)	-0.57	(-1.60, 0.45)	0.27		-0.02	0.70	-0.01	0.75	-0.01	0.57	0.38	(-0.56, 1.32)	0.43		0.004	0.93	0.04	0.29	-0.02	0.20	-0.06	(-0.88, 0.76)	0.88		-0.01	0.73	0.02	0.57	-0.02	0.20
	PM_{10} (µg/m^3)	-0.64	(-1.25, -0.02)	**0.04**		0.01	0.61	0.00	0.91	0.00	0.80	-0.04	(-0.62, 0.53)	0.89		0.019	0.43	0.05	0.25	-0.02	0.13	-0.31	(-0.80, 0.18)	0.21		0.01	0.53	0.03	0.45	-0.01	0.23
	PM_{coarse} (µg/m^3)	-1.82	(-3.07, -0.56)	**0.01**	A	0.08	0.13	0.00	0.93	0.01	0.54	-0.83	(-2.05, 0.39)	0.18		0.079	**0.10**	B	0.06	0.17	-0.02	0.33	-1.30	(-2.32, -0.28)	**0.01**	A	0.075	**0.06**	0.03	0.31	0.00	0.73

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

Exclusion of FVC outliers

Table S16: Stability analysis for associations between respiratory outcomes, physical activity, pollutants and pre-exposure assessed using mixed effects models with continous covariates (Exclusion of FVC outliers)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1				IA1			IA2			IA3				CO1				IA1			IA2			IA3				CO1				IA1			IA2			IA3		
	Estimate SP	Coeff.	95% CI	p		Coeff.	p		Coeff	p		Coeff.	p			Coeff.	95% CI	p		Coeff.	p		Coef	p		Coeff	p			Coeff.	95% CI	p		Coeff	p		Coeff.	p		Coef	p	
PEF (L/min)	NO_x (ppm)	-6.48	(-25.3, 12.3)	0.49		1.05	0.27		0.003	0.79		0.35	0.41			12.44	(-0.7, 25.6)	**0.06**	E	-0.70	0.29		0.01	0.52		-0.17	0.56			3.23	(-9.6, 16.1)	0.62		0.24	0.72		0.00	0.64		0.10	0.73	
	NO (ppm)	-6.89	(-28.0, 14.2)	0.52		1.24	0.26		0.003	0.81		0.39	0.45			13.74	(-1.2, 28.7)	**0.07**		-1.05	0.18		0.01	0.47		-0.26	0.49			3.61	(-10.9, 18.1)	0.62		0.18	0.81		0.00	0.63		0.08	0.83	
	BC (10*µg/m^3)	-0.88	(-5.9, 4.1)	0.73		0.34	0.20		0.003	0.83		0.13	0.27			3.24	(-0.2, 6.7)	**0.07**		-0.17	0.38		0.01	0.46		-0.12	0.16			1.3	(-2.1, 4.7)	0.45		0.11	0.55		0.00	0.64		0.01	0.85	
	UFP (10^5*cm^{-3})	-0.3	(-1.27, 0.68)	0.54		0.06	0.26		0.003	0.82		0.02	0.49			0.58	(-0.10, 1.26)	**0.09**		-0.04	0.24		0.01	0.47		-0.01	0.44			0.17	(-0.50, 0.83)	0.62		0.01	0.77		0.00	0.63		0.00	0.87	
	$PM_{2.5}$ (µg/m^3)	-0.07	(-0.34, 0.21)	0.64		0.02	**0.09**	B	0.003	0.81		0.008	0.12			0.15	(-0.05, 0.34)	0.14		0.00	0.83		0.01	0.51		-0.01	0.15			0.05	(-0.14, 0.24)	0.58		0.010	0.23		0.00	0.65		0.00	0.59	
	PM_{10} (µg/m^3)	-0.05	(-0.22, 0.12)	0.55		0.01	**0.06**		0.004	0.77		0.007	**0.01**	C		0.06	(-0.06, 0.18)	0.34		0.00	0.68		0.01	0.50		0.00	0.13			0.02	(-0.10, 0.13)	0.80		0.01	**0.09**		0.00	0.63		0.00	0.24	
	PM_{coarse} (µg/m^3)	-0.09	(-0.47, 0.28)	0.62		0.03	**0.07**		0.003	0.78		0.013	**0.01**			0.00	(-0.26, 0.26)	0.99		0.01	0.24		0.01	0.44		0.00	0.33			-0.01	(-0.26, 0.24)	0.91		0.02	**0.04**		0.00	0.59		0.01	0.14	
FEV_1 (mL)	NO_x (ppm)	-40.8	(-102.6, 21.0)	0.19		-1.15	0.71		-0.04	0.34		0.12	0.93			16.7	(-41.9, 75.3)	0.57		2.45	0.41		0.02	0.69		-0.37	0.78			-6.8	(-57.6, 44.1)	0.79		0.93	0.72		-0.01	0.76		0.07	0.95	
	NO (ppm)	-38.4	(-108.1, 31.3)	0.28		-0.46	0.90		-0.04	0.31		0.24	0.89			21.1	(-45.4, 87.6)	0.53		3.14	0.37		0.02	0.67		-0.85	0.61			-2.2	(-59.5, 55.2)	0.94		1.55	0.61		-0.01	0.75		-0.02	0.99	
	BC (10*µg/m^3)	-7.55	(-24.1, 9.0)	0.37		-0.52	0.56		-0.04	0.30		0.22	0.57			6.65	(-8.9, 22.2)	0.40		0.75	0.38		0.02	0.67		-0.32	0.39			1.1	(-12.4, 14.6)	0.87		0.20	0.79		-0.01	0.74		0.02	0.95	
	UFP (10^5*cm^{-3})	-1.66	(-4.88, 1.56)	0.31		-0.02	0.91		-0.04	0.30		-0.01	0.95			1.30	(-1.72, 4.31)	0.39		0.08	0.61		0.02	0.67		-0.06	0.37			0.17	(-2.45, 2.79)	0.90		0.04	0.77		-0.01	0.74		-0.02	0.70	
	$PM_{2.5}$ (µg/m^3)	-0.66	(-1.57, 0.26)	0.16		-0.04	0.39		-0.04	0.34		0.00	0.83			0.22	(-0.64, 1.08)	0.61		0.03	0.46		0.02	0.68		-0.01	0.40			-0.12	(-0.87, 0.62)	0.74		0.00	0.97		-0.01	0.77		-0.01	0.63	
	PM_{10} (µg/m^3)	-0.62	(-1.18, -0.06)	**0.03**		-0.01	0.52		-0.03	0.43		0.00	0.97			-0.031	(-0.56, 0.50)	0.91		0.03	0.20		0.02	0.64		-0.01	0.34			-0.25	(-0.71, 0.21)	0.28		0.011	0.55		-0.01	0.85		0.00	0.78	
	PM_{coarse} (µg/m^3)	-1.63	(-2.84, -0.43)	**0.01**	A	-0.008	0.86		-0.03	0.51		0.01	0.47			-0.55	(-1.69, 0.58)	0.34		0.08	**0.06**		0.02	0.56		-0.01	0.61			-0.91	(-1.87, 0.06)	**0.07**	A	0.05	0.21		0.00	0.96		0.00	0.75	
FEV_1/FVC (%)	NO_x (ppm)	-0.4	(-1.10, 0.29)	0.25		0.01	0.86		-0.001	0.10	D	0.03	**0.09**			-0.201	(-0.92, 0.52)	0.58		0.00	0.96		0.00	0.44		0.01	0.45			-0.260	(-0.81, 0.29)	0.35		0.004	0.90		-0.001	0.15	D	0.02	0.12	
	NO (ppm)	-0.59	(-1.36, 0.19)	0.14		0.02	0.63		-0.001	**0.10**		0.03	0.11			-0.223	(-1.04, 0.60)	0.59		0.00	0.94		0.00	0.43		0.01	0.52			-0.344	(-0.97, 0.28)	0.28		0.011	0.74		-0.001	0.14		0.02	0.14	
	BC (10*µg/m^3)	-0.09	(-0.28, 0.09)	0.32		0.00	0.71		-0.001	**0.09**		0.011	**0.01**	C		-0.023	(-0.21, 0.17)	0.81		0.00	0.86		0.00	0.42		0.00	0.61			-0.044	(-0.19, 0.10)	0.55		0.002	0.85		-0.001	0.14		0.01	**0.05**	C
	UFP (10^5*cm^{-3})	-0.03	(-0.06, 0.01)	0.15		0.00	0.70		-0.001	**0.09**		0.001	**0.07**			-0.010	(-0.05, 0.03)	0.59		0.00	0.64		0.00	0.43		0.00	0.55			-0.015	(-0.04, 0.01)	0.29		0.000	0.99		-0.001	0.14		0.00	0.12	
	$PM_{2.5}$ (µg/m^3)	-0.003	(-0.01, 0.01)	0.51		0.00	1.00		-0.001	**0.09**		0.0004	**0.05**			-0.002	(-0.01, 0.01)	0.70		0.00	0.66		0.00	0.44		0.00	0.36			-0.002	(-0.01, 0.01)	0.64		0.000	0.84		-0.001	0.14		0.00	**0.08**	
	PM_{10} (µg/m^3)	-0.001	(-0.01, 0.01)	0.78		0.00	0.81		-0.001	**0.09**		0.0002	**0.04**			-0.001	(-0.01, 0.01)	0.74		0.00	0.63		0.00	0.44		0.00	0.38			0.00	(-0.01, 0.00)	0.87		0.000	0.69		-0.001	0.13		0.00	**0.08**	
	PM_{coarse} (µg/m^3)	0.003	(-0.01, 0.02)	0.67		0.00	0.56		-0.001	**0.06**		0.00	0.17			-0.001	(-0.02, 0.01)	0.86		0.00	0.65		0.00	0.43		0.00	0.54			0.00	(-0.01, 0.01)	0.72		0.000	0.52		-0.001	0.11		0.00	0.26	
FVC (mL)	NO_x (ppm)	-21.9	(-92.3, 48.4)	0.54		-1.65	0.65		-0.01	0.81		-1.11	0.49			16.5	(-42.9, 75.9)	0.58		1.605	0.60		0.04	0.24		-1.47	0.28			1.6	(-53.0, 56.3)	0.95		0.26	0.9		0.02	0.61		-1.01	0.41	
	NO (ppm)	-10.7	(-90.0, 68.6)	0.79		-1.64	0.69		-0.01	0.77		-1.23	0.53			22.4	(-45.0, 89.8)	0.51		1.976	0.58		0.04	0.24		-2.34	0.16			10.8	(-50.8, 72.3)	0.73		0.34	0.9		0.02	0.62		-1.42	0.35	
	BC (10*µg/m^3)	-3.32	(-22.1, 15.4)	0.73		-0.81	0.42		-0.01	0.78		-0.29	0.52			5.12	(-10.6, 20.9)	0.52		0.629	0.47		0.04	0.24		-0.61	0.10			2.1	(-12.4, 16.6)	0.77		-0.02	0.98		0.02	0.62		-0.35	0.30	
	UFP (10^5*cm^{-3})	-0.41	(-4.07, 3.24)	0.82		-0.07	0.71		-0.01	0.77		-0.08	0.36			1.43	(-1.63, 4.48)	0.35		0.06	0.71		0.04	0.24		-0.13	**0.07**			0.80	(-2.01, 3.61)	0.57		0.00	0.99		0.02	0.63		-0.09	0.17	
	$PM_{2.5}$ (µg/m^3)	-0.52	(-1.56, 0.52)	0.32		-0.04	0.42		-0.01	0.84		-0.02	0.22			0.19	(-0.68, 1.06)	0.67		0.032	0.41		0.04	0.24		-0.03	**0.08**			-0.09	(-0.89, 0.71)	0.82		0.00	0.95		0.02	0.60		-0.02	0.12	
	PM_{10} (µg/m^3)	-0.65	(-1.29, -0.02)	**0.04**		-0.01	0.85		0.00	1.00		-0.01	0.32			-0.07	(-0.60, 0.47)	0.80		0.039	**0.08**		0.05	0.21		-0.02	**0.07**			-0.30	(-0.78, 0.19)	0.23		0.02	0.28		0.02	0.50		-0.01	0.20	
	PM_{coarse} (µg/m^3)	-2.08	(-3.42, -0.74)	**0.003**	A	0.04	0.46		0.01	0.82		0.00	0.94			-0.67	(-1.82, 0.48)	0.25		0.118	**0.01**	B	0.05	0.17		-0.02	0.29			-1.19	(-2.22, -0.17)	**0.02**	A	0.089	**0.02**		0.03	0.37		0.00	0.83	

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

Exclusion of FEV1 outlier

Table S17: Stability analysis for associations between respiratory outcomes, physical activity, pollutants and pre-exposure assessed using mixed effects models with continous covariates (Exclusion of FEV1 outliers)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3	
	Estimate SP	Coeff.	95% CI	p		Coeff	p	Coeff	p	Coeff.	p	Coeff.	95% CI	p		Coeff	p	Coef	p	Coeff	p	Coeff.	95% CI	p		Coeff	p	Coeff.	p	Coef	p
PEF (L/min)	NO_x (ppm)	-6.36	(-25.3, 12.5)	0.50		1.48	0.12	0.001	0.97	0.38	0.36	12.05	(-0.7, 24.8)	**0.06**	E	-0.65	0.31	0.00	0.71	-0.21	0.46	3.30	(-9.5, 16.1)	0.61		0.40	0.53	0.00	0.82	0.11	0.71
	NO (ppm)	-7.07	(-28.1, 14.0)	0.51		1.73	0.11	0.000	0.99	0.42	0.41	13.14	(-1.3, 27.6)	**0.07**		-0.93	0.22	0.00	0.65	-0.30	0.38	3.45	(-11.0, 17.9)	0.63		0.40	0.60	0.00	0.80	0.08	0.82
	BC (10*µg/m³)	-0.9	(-5.9, 4.1)	0.72		0.46	**0.09**	0.000	0.99	0.14	0.22	3.04	(-0.33, 6.42)	**0.08**		-0.15	0.41	0.00	0.64	-0.12	0.12	1.2	(-2.20, 4.55)	0.49		0.17	0.36	0.00	0.81	0.02	0.82
	UFP (10^5*cm^{-3})	-0.27	(-1.23, 0.70)	0.59		0.07	0.13	0.000	1.00	0.02	0.46	0.56	(-0.10, 1.22)	**0.10**		-0.04	0.28	0.00	0.64	-0.01	0.37	0.17	(-0.49, 0.83)	0.62		0.02	0.57	0.00	0.80	0.00	0.85
	$PM_{2.5}$ (µg/m³)	-0.08	(-0.36, 0.20)	0.56		0.03	**0.04**	0.000	0.98	0.008	0.12	0.14	(-0.05, 0.33)	0.14		0.00	0.86	0.00	0.68	0.00	0.16	0.04	(-0.15, 0.23)	0.69		0.013	0.13	0.00	0.81	0.00	0.54
	PM_{10} (µg/m³)	-0.07	(-0.24, 0.10)	0.42		0.02	**0.01**	0.001	0.94	0.007	**0.01**	0.05	(-0.07, 0.16)	0.41		0.00	0.70	0.00	0.66	0.00	0.14	0.00	(-0.12, 0.12)	1.00		0.01	**0.04**	0.00	0.78	0.00	0.20
	PM_{coarse} (µg/m³)	-0.14	(-0.51, 0.22)	0.44		0.03	**0.02**	0.001	0.93	0.013	**0.007**	-0.03	(-0.28, 0.22)	0.82		0.01	0.28	0.00	0.56	0.00	0.32	-0.05	(-0.30, 0.19)	0.66		0.02	**0.02**	0.00	0.73	0.01	0.10
FEV_1 (mL)	NO_x (ppm)	-27	(-87.2, 33.3)	0.38		-1.31	0.67	-0.04	0.26	0.54	0.69	27.3	(-31.0, 85.7)	0.35		2.60	0.38	0.01	0.82	-0.16	0.90	3.0	(-47.5, 53.4)	0.91		0.65	0.80	-0.02	0.57	0.17	0.88
	NO (ppm)	-24	(-91.3, 43.2)	0.48		-0.86	0.81	-0.04	0.24	0.75	0.65	33.4	(-32.5, 99.4)	0.32		3.43	0.32	0.01	0.79	-0.42	0.80	7.0	(-49.7, 63.7)	0.81		1.42	0.63	-0.02	0.57	0.17	0.90
	BC (10*µg/m³)	-4.6	(-20.4, 11.2)	0.56		-0.42	0.63	-0.04	0.24	0.36	0.33	9.09	(-6.3, 24.5)	0.24		0.78	0.36	0.01	0.79	-0.23	0.52	2.8	(-10.5, 16.1)	0.68		0.20	0.78	-0.02	0.56	0.06	0.85
	UFP (10^5*cm^{-3})	-0.93	(-4.02, 2.16)	0.55		-0.03	0.86	-0.04	0.24	0.02	0.76	1.81	(-1.20, 4.81)	0.23		0.09	0.58	0.01	0.80	-0.05	0.51	0.55	(-2.04, 3.14)	0.67		0.03	0.80	-0.02	0.56	-0.01	0.84
	$PM_{2.5}$ (µg/m³)	-0.53	(-1.42, 0.37)	0.25		-0.02	0.65	-0.04	0.26	0.00	0.80	0.36	(-0.49, 1.22)	0.40		0.03	0.47	0.01	0.81	-0.01	0.54	-0.03	(-0.77, 0.71)	0.93		0.00	0.90	-0.02	0.58	0.00	0.80
	PM_{10} (µg/m³)	-0.50	(-1.05, 0.05)	**0.07**		0.00	1.00	-0.04	0.31	0.01	0.45	0.020	(-0.51, 0.55)	0.94		0.02	0.28	0.01	0.75	-0.01	0.42	-0.20	(-0.65, 0.25)	0.38		0.011	0.55	-0.01	0.65	0.00	0.93
	PM_{coarse} (µg/m³)	-1.3	(-2.45, -0.15)	**0.03**	A	0.023	0.60	-0.03	0.35	0.02	0.18	-0.57	(-1.70, 0.56)	0.32		0.07	0.14	0.02	0.62	-0.01	0.60	-0.85	(-1.80, 0.10)	**0.08**	A	0.04	0.24	-0.01	0.76	0.01	0.68
FEV_1/FVC (%)	NO_x (ppm)	-0.43	(-1.12, 0.26)	0.22		0.02	0.64	-0.001	**0.09**	0.03	**0.07**	-0.107	(-0.82, 0.61)	0.77		-0.01	0.83	0.00	0.36	0.01	0.51	-0.221	(-0.77, 0.33)	0.43		0.006	0.83	-0.001	0.10	0.02	0.11
	NO (ppm)	-0.58	(-1.35, 0.18)	0.13		0.03	0.47	-0.001	**0.08**	0.03	**0.07**	-0.111	(-0.92, 0.70)	0.79		-0.01	0.84	0.00	0.36	0.01	0.57	-0.287	(-0.90, 0.33)	0.36		0.013	0.69	-0.001	**0.10**	0.02	0.12
	BC (10*µg/m³)	-0.09	(-0.27, 0.09)	0.32		0.01	0.48	-0.001	**0.08**	0.012	**0.004**	-0.002	(-0.19, 0.19)	0.99		0.00	0.73	0.00	0.35	0.00	0.68	-0.034	(-0.18, 0.11)	0.65		0.003	0.75	-0.001	**0.09**	0.01	**0.04**
	UFP (10^5*cm^{-3})	-0.03	(-0.06, 0.01)	0.15		0.00	0.51	-0.001	**0.08**	0.002	**0.04**	-0.005	(-0.04, 0.03)	0.78		0.00	0.52	0.00	0.36	0.00	0.59	-0.013	(-0.04, 0.02)	0.37		0.000	0.94	-0.001	**0.10**	0.00	**0.10**
	$PM_{2.5}$ (µg/m³)	-0.004	(-0.01, 0.01)	0.44		0.00	0.65	-0.001	**0.08**	0.0004	**0.03**	-0.001	(-0.01, 0.01)	0.92		0.00	0.55	0.00	0.35	0.00	0.38	-0.002	(-0.01, 0.01)	0.71		0.000	0.99	-0.001	**0.09**	0.00	**0.05**
	PM_{10} (µg/m³)	-0.001	(-0.01, 0.01)	0.74		0.00	0.84	-0.001	**0.08**	0.0003	**0.02**	0.000	(-0.01, 0.01)	0.90		0.00	0.45	0.00	0.35	0.00	0.47	0.00	(-0.01, 0.00)	0.92		0.000	0.80	-0.001	**0.09**	0.00	**0.06**
	PM_{coarse} (µg/m³)	0.003	(-0.01, 0.02)	0.64		0.00	0.83	-0.001	**0.06**	0.00	**0.10**	-0.001	(-0.01, 0.01)	0.88		0.00	0.44	0.00	0.36	0.00	0.67	0.00	(-0.01, 0.01)	0.74		0.000	0.59	-0.001	**0.08**	0.00	0.22
FVC (mL)	NO_x (ppm)	-2.93	(-71.2, 65.4)	0.93		-2.45	0.48	-0.02	0.71	-0.65	0.67	28.3	(-30.7, 87.2)	0.34		2.248	0.45	0.04	0.30	-0.98	0.46	13.3	(-40.5, 67.1)	0.62		-0.12	0.96	0.01	0.78	-0.85	0.48
	NO (ppm)	7.652	(-68.4, 83.7)	0.84		-2.67	0.50	-0.02	0.70	-0.69	0.71	36.1	(-30.5, 102.7)	0.28		2.908	0.41	0.04	0.29	-1.46	0.37	21.3	(-39.1, 81.7)	0.48		0.18	0.95	0.01	0.77	-1.13	0.45
	BC (10*µg/m³)	0.407	(-17.5, 18.3)	0.96		-0.84	0.39	-0.02	0.71	-0.12	0.78	8.00	(-7.6, 23.6)	0.31		0.784	0.36	0.04	0.29	-0.44	0.23	4.2	(-10.0, 18.3)	0.56		-0.05	0.95	0.01	0.77	-0.29	0.38
	UFP (10^5*cm^{-3})	0.523	(-2.97, 4.01)	0.77		-0.11	0.54	-0.02	0.70	-0.05	0.55	1.99	(-1.03, 5.02)	0.19		0.091	0.56	0.04	0.29	-0.09	0.17	1.25	(-1.51, 4.00)	0.37		-0.01	0.94	0.01	0.78	-0.07	0.24
	$PM_{2.5}$ (µg/m³)	-0.32	(-1.33, 0.70)	0.54		-0.03	0.59	-0.01	0.74	-0.02	0.40	0.33	(-0.53, 1.20)	0.45		0.036	0.37	0.04	0.29	-0.02	0.16	0.03	(-0.76, 0.82)	0.94		0.00	0.96	0.01	0.75	-0.02	0.18
	PM_{10} (µg/m³)	-0.49	(-1.11, 0.13)	0.12		0.01	0.71	-0.01	0.85	0.00	0.76	-0.02	(-0.55, 0.51)	0.94		0.037	0.10	0.04	0.26	-0.01	0.13	-0.23	(-0.71, 0.25)	0.35		0.02	0.32	0.02	0.65	-0.01	0.28
	PM_{coarse} (µg/m³)	-1.66	(-2.95, -0.38)	**0.01**	A	0.07	0.15	0.00	0.98	0.01	0.49	-0.70	(-1.83, 0.44)	0.23		0.105	**0.02**	B 0.05	0.18	-0.01	0.35	-1.11	(-2.11, -0.10)	**0.03**	A	0.083	**0.03**	0.02	0.49	0.00	0.89

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

Exclusion of PEF outliers

Table S18: Stability analysis for associations between respiratory outcomes, physical activity, pollutants and pre-exposure assessed using mixed effects models with continous covariates (Exclusion of PEF outliers)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3		CO1				IA1		IA2		IA3	
	Estimate SP	Coeff.	95% CI	p		Coeff.	p	Coeff	p	Coeff.	p	Coeff.	95% CI	p		Coeff.	p	Coef	p	Coeff	p	Coeff.	95% CI	p		Coeff	p	Coeff.	p	Coeff.	p
PEF (L/min)	NO_x (ppm)	-6.263	(-22.7, 10.2)	0.45		1.47	**0.07**	0.006	0.58	0.49	0.18	12.52	(-0.4, 25.4)	**0.06**	E	-1.01	0.12	0.01	0.40	-0.05	0.88	2.82	(-9.0, 14.7)	0.64		0.23	0.70	0.01	0.38	0.22	0.41
	NO (ppm)	-6.796	(-25.4, 11.8)	0.47		1.70	**0.07**	0.005	0.61	0.53	0.24	12.71	(-1.9, 27.3)	**0.09**		-1.43	**0.06**	0.01	0.36	-0.13	0.73	2.53	(-10.8, 15.9)	0.71		0.14	0.85	0.01	0.37	0.21	0.53
	BC (10*µg/m^3)	-0.899	(-5.3, 3.5)	0.68		0.45	**0.05**	0.005	0.63	0.17	**0.10**	2.97	(-0.47, 6.41)	**0.09**		-0.28	0.12	0.01	0.35	-0.08	0.35	0.9	(-2.22, 4.05)	0.56		0.08	0.63	0.01	0.38	0.06	0.46
	UFP (10^5*cm^{-3})	-0.288	(-1.14, 0.56)	0.50		0.09	**0.05**	0.005	0.61	0.02	0.23	0.53	(-0.13, 1.20)	0.12		-0.06	**0.07**	0.01	0.35	-0.01	0.71	0.11	(-0.50, 0.72)	0.73		0.01	0.72	0.01	0.37	0.01	0.53
	$PM_{2.5}$ (µg/m^3)	-0.051	(-0.29, 0.19)	0.68		0.02	**0.04**	0.005	0.61	0.009	**0.03**	0.14	(-0.05, 0.33)	0.14		-0.01	0.49	0.01	0.38	0.00	0.44	0.04	(-0.13, 0.22)	0.61		0.008	0.29	0.01	0.39	0.00	0.25
	PM_{10} (µg/m^3)	-0.02	(-0.16, 0.13)	0.81		0.01	**0.07**	0.005	0.62	0.007	**0.003**	0.05	(-0.07, 0.17)	0.42	C	0.00	0.87	0.01	0.38	0.00	0.43	0.02	(-0.09, 0.12)	0.74		0.01	0.23	0.01	0.38	0.00	**0.06**
	PM_{coarse} (µg/m^3)	0.023	(-0.29, 0.34)	0.88		0.02	0.23	0.005	0.66	0.012	**0.004**	-0.03	(-0.28, 0.23)	0.82		0.01	0.52	0.01	0.33	0.00	0.65	0.01	(-0.21, 0.24)	0.92		0.01	0.25	0.01	0.37	0.01	**0.04**
FEV_1 (mL)	NO_x (ppm)	-37.17	(-93.6, 19.2)	0.19		-0.64	0.82	-0.03	0.38	0.45	0.72	24.3	(-35.6, 84.2)	0.42		0.54	0.86	0.03	0.52	0.62	0.65	-6.3	(-53.8, 41.2)	0.79		-0.14	0.95	-0.01	0.78	0.42	0.70
	NO (ppm)	-34.42	(-98.2, 29.4)	0.29		-0.01	1.00	-0.03	0.35	0.58	0.71	24.2	(-43.3, 91.6)	0.48		0.27	0.94	0.03	0.49	0.34	0.85	-4.8	(-58.3, 48.7)	0.86		0.04	0.99	-0.01	0.77	0.30	0.82
	BC (10*µg/m^3)	-6.696	(-21.8, 8.4)	0.38		-0.45	0.58	-0.03	0.34	0.31	0.37	6.87	(-9.0, 22.8)	0.39		-0.05	0.96	0.03	0.49	-0.01	0.99	0.1	(-12.5, 12.7)	0.99		-0.29	0.672	-0.01	0.76	0.11	0.71
	UFP (10^5*cm^{-3})	-1.497	(-4.42, 1.43)	0.31		0.02	0.89	-0.03	0.35	0.01	0.85	1.38	(-1.70, 4.46)	0.37		-0.06	0.72	0.03	0.49	-0.02	0.83	-0.05	(-2.49, 2.40)	0.97		-0.03	0.834	-0.01	0.76	-0.01	0.88
	$PM_{2.5}$ (µg/m^3)	-0.532	(-1.36, 0.30)	0.21		-0.04	0.28	-0.03	0.38	0.00	0.98	0.29	(-0.59, 1.17)	0.52		0.00	0.97	0.03	0.51	0.00	0.93	-0.12	(-0.82, 0.57)	0.73		-0.02	0.507	-0.01	0.79	0.00	0.93
	PM_{10} (µg/m^3)	-0.43	(-0.93, 0.07)	**0.09**		-0.02	0.25	-0.03	0.43	0.00	0.74	-0.036	(-0.58, 0.51)	0.89		0.01	0.65	0.03	0.48	0.00	0.97	-0.24	(-0.66, 0.18)	0.27		-0.007	0.694	-0.01	0.87	0.00	1.00
	PM_{coarse} (µg/m^3)	-1.033	(-2.10, 0.03)	**0.06**	A	-0.043	0.32	-0.03	0.46	0.01	0.42	-0.67	(-1.82, 0.48)	0.25		0.05	0.28	0.03	0.41	0.00	0.94	-0.86	(-1.76, 0.03)	**0.06**	A	0.00	0.89	0.00	0.97	0.01	0.67
FEV_1/FVC (%)	NO_x (ppm)	-0.322	(-1.00, 0.36)	0.35		0.01	0.80	-0.001	**0.08**	0.03	**0.06**	-0.227	(-0.91, 0.46)	0.51		-0.02	0.55	0.000	0.36	0.01	0.48	-0.236	(-0.77, 0.30)	0.38		-0.007	0.81	-0.001	**0.09**	0.02	**0.09**
	NO (ppm)	-0.487	(-1.25, 0.28)	0.21		0.02	0.58	-0.001	**0.08**	0.03	**0.06**	-0.282	(-1.06, 0.49)	0.47		-0.03	0.49	0.000	0.35	0.01	0.60	-0.337	(-0.93, 0.26)	0.27		-0.003	0.92	-0.001	**0.09**	0.02	0.12
	BC (10*µg/m^3)	-0.065	(-0.25, 0.12)	0.47		0.00	0.67	-0.001	**0.07**	0.012	**0.005**	-0.053	(-0.24, 0.13)	0.57		-0.01	0.37	0.000	0.34	0.00	0.62	-0.046	(-0.19, 0.10)	0.52		-0.003	0.74	-0.001	**0.08**	0.01	**0.03**
	UFP (10^5*cm^{-3})	-0.021	(-0.06, 0.01)	0.24		0.00	0.65	-0.001	**0.08**	0.002	**0.03**	-0.013	(-0.05, 0.02)	0.45		-0.002	0.26	0.000	0.34	0.00	0.60	-0.015	(-0.04, 0.01)	0.28		-0.001	0.64	-0.001	**0.09**	0.0010	**0.10**
	$PM_{2.5}$ (µg/m^3)	-0.002	(-0.01, 0.01)	0.76		0.00	0.91	-0.001	**0.07**	0.0004	**0.03**	-0.003	(-0.01, 0.01)	0.60		0.000	0.35	0.000	0.35	0.00	0.23	-0.001	(-0.01, 0.01)	0.76		0.000	0.45	-0.001	**0.08**	0.0003	**0.03**
	PM_{10} (µg/m^3)	0.0004	(-0.01, 0.01)	0.89		0.00	0.72	-0.001	**0.06**	0.0002	**0.03**	-0.002	(-0.01, 0.00)	0.60		0.000	0.34	0.000	0.36	0.00	0.29	0.000	(0.00, 0.00)	1.00		0.000	0.33	-0.001	**0.08**	0.0002	**0.04**
	PM_{coarse} (µg/m^3)	0.005	(-0.01, 0.02)	0.41		0.00	0.46	-0.001	**0.04**	0.00	0.17	-0.003	(-0.02, 0.01)	0.68		0.000	0.44	0.000	0.36	0.00	0.53	0.003	(-0.01, 0.01)	0.63		-0.001	0.24	-0.001	**0.06**	0.0002	0.19
FVC (mL)	NO_x (ppm)	-24.23	(-84.7, 36.2)	0.43		-1.02	0.74	0.00	0.90	-0.77	0.57	30.7	(-30.8, 92.1)	0.32		0.569	0.85	0.06	0.15	-0.16	0.91	0.3	(-50.0, 50.7)	0.99		-0.32	0.899	0.02	0.45	-0.61	0.59
	NO (ppm)	-13.78	(-82.1, 54.5)	0.69		-1.03	0.77	0.00	0.96	-0.97	0.56	33.8	(-35.3, 103.0)	0.33		0.261	0.94	0.06	0.14	-0.65	0.71	6.5	(-50.2, 63.1)	0.82		-0.50	0.865	0.02	0.45	-1.01	0.47
	BC (10*µg/m^3)	-4.47	(-20.6, 11.6)	0.58		-0.70	0.42	0.00	0.95	-0.17	0.66	8.05	(-8.3, 24.4)	0.33		0.11	0.90	0.06	0.14	-0.24	0.55	0.7	(-12.6, 14.1)	0.91		-0.33	0.643	0.02	0.45	-0.24	0.45
	UFP (10^5*cm^{-3})	-0.638	(-3.77, 2.50)	0.69		-0.01	0.95	0.00	0.95	-0.06	0.40	1.90	(-1.25, 5.05)	0.23		-0.033	0.84	0.06	0.14	-0.06	0.39	0.47	(-2.12, 3.06)	0.72		-0.03	0.821	0.02	0.46	-0.07	0.24
	$PM_{2.5}$ (µg/m^3)	-0.496	(-1.38, 0.39)	0.27		-0.04	0.32	0.01	0.87	-0.02	0.24	0.35	(-0.56, 1.26)	0.44		0.012	0.77	0.06	0.15	-0.01	0.44	-0.14	(-0.88, 0.60)	0.71		-0.01	0.691	0.03	0.42	-0.02	0.20
	PM_{10} (µg/m^3)	-0.49	(-1.02, 0.04)	**0.07**		-0.02	0.42	0.01	0.76	-0.01	0.41	-0.03	(-0.59, 0.53)	0.92		0.022	0.33	0.06	0.13	-0.01	0.40	-0.30	(-0.75, 0.14)	0.18		0.00	0.796	0.03	0.34	-0.01	0.27
	PM_{coarse} (µg/m^3)	-1.395	(-2.51, -0.28)	**0.02**	A	-0.01	0.79	0.02	0.68	0.00	0.89	-0.75	(-1.93, 0.43)	0.21		0.083	**0.07**	B 0.06	0.10	-0.01	0.69	-1.15	(-2.08, -0.22)	**0.02**	A	0.044	0.236	0.04	0.25	0.00	0.84

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

10) Stability analysis: Inclusion of post-exposure (free-living) estimate for HR as a covariate

Estimates and interaction terms that turned statistically significant in the stability analysis compared with the general analysis are marked in green, whereas estimates and interaction terms that turned statistically insignificant compared to the general analysis are marked in orange.

Table S19: Stability analysis for associations between respiratory outcomes, PA-status, exposure site and pre-exposure

RM	Model	Estimate	Time point 1 (T_1)			Time Point 2 (T_2)			Pooled T_1 and T_2		
			Coeff.	95% CI	p	Coeff.	95% CI	p	Coeff.	95% CI	p
PEF (L/min)		PA	8.2	(-4.6, 21.0)	0.21	1.7	(-8.1, 11.4)	0.73	4.3	(-4.5, 13.0)	0.33
	CA1	High TRAP site	-2.6	(-14.8, 9.7)	0.68	6.7	(-2.6, 15.9)	0.15	3.6	(-4.7, 11.8)	0.39
		Rest & LT	14.4	(-2.6, 31.4)	**0.10**	**-13.7**	**(-26.5, -0.8)**	**0.04**	-5.15	(-16.8, 6.5)	0.38
		PA & HT	**19.6**	**(2.5, 36.8)**	**0.03**	-5.0	(-18.0, 7.9)	0.44	2.8	(-9.0, 14.6)	0.64
	CA2	PA & LT	10.3	(-7.5, 28.0)	0.25	-4.6	(-18.1, 9.0)	0.50	0.6	(-11.7, 12.9)	0.92
	IA1	PA*Exp.	**23.7**	**(-0.2, 47.7)**	**0.05**	-14.1	(-32.3, 4.1)	0.13	-3.0	(-19.5, 13.5)	0.72
	IA2	PA*Pre-exp.	0.04	(-0.37, 0.45)	0.85	0.2	(-0.12, 0.49)	0.24	0.1	(-0.13, 0.42)	0.29
	IA3	Exp.*Pre-exp.	0.09	(-0.30, 0.48)	0.65	-0.1	(-0.37, 0.22)	0.60	-0.02	(-0.28, 0.24)	0.87
FEV_1 (mL)		PA	**46.2**	**(3.3, 89.1)**	**0.04**	12.6	(-33.3, 58.6)	0.59	**32.4**	(-5.7, 70.6)	**0.09**
	CA1	High TRAP site	-16.9	(-57.4, 23.6)	0.41	23.2	(-20.2, 66.6)	0.29	0.2	(-35.8, 36.2)	0.99
		Rest & LT	20.2	(-37.1, 77.4)	0.49	-25.0	(-86.3, 36.3)	0.42	0.65	(-50.2, 51.5)	0.98
		PA & HT	**49.3**	(-8.6, 107.2)	**0.09**	10.9	(-51.1, 72.9)	0.73	33.2	(-18.3, 84.7)	0.20
	CA2	PA & LT	**62.9**	**(2.2, 123.5)**	**0.04**	-10.6	(-75.5, 54.4)	0.75	32.2	(-21.8, 86.1)	0.24
	IA1	PA*Exp.	6.60	(-74.4, 87.6)	0.87	-3.6	(-90.4, 83.2)	0.94	1.7	(-70.3, 73.7)	0.96
	IA2	PA*Pre-exp.	-0.69	(-2.03, 0.65)	0.31	0.6	(-0.84, 2.04)	0.41	-0.1	(-1.33, 1.07)	0.83
	IA3	Exp.*Pre-exp.	0.06	(-1.23, 1.35)	0.93	-0.1	(-1.52, 1.23)	0.83	-0.02	(-1.16, 1.13)	0.97
FEV1/FVC (%)		PA	**0.63**	**(0.16, 1.10)**	**0.01**	0.29	(-0.24, 0.81)	0.15	**0.50**	**(0.11, 0.90)**	**0.01**
	CA1	High TRAP site	-0.24	(-0.68, 0.21)	0.29	-0.10	(-0.60, 0.40)	0.15	-0.19	(-0.56, 0.19)	0.32
		Rest & LT	0.29	(-0.34, 0.92)	0.36	0.05	(-0.66, 0.75)	0.89	0.19	(-0.34, 0.71)	0.48
		PA & HT	**0.68**	**(0.04, 1.32)**	**0.04**	0.23	(-0.48, 0.94)	0.52	0.50	(-0.03, 1.03)	**0.06**
	CA2	PA & LT	**0.86**	**(0.20, 1.53)**	**0.01**	0.39	(-0.35, 1.13)	0.30	**0.69**	**(0.13, 1.25)**	**0.02**
	IA1	PA*Exp.	0.11	(-0.78, 1.00)	0.81	-0.11	(-1.10, 0.88)	0.83	-0.002	(-0.7, 0.7)	1.00
	IA2	PA*Pre-exp.	-0.01	**(-0.03, 0.00)**	**0.05**	0.00	(-0.02, 0.01)	0.66	-0.01	(-0.02, 0.00)	0.12
	IA3	Exp.*Pre-exp.	0.01	(0.00, 0.02)	0.12	0.01	(-0.01, 0.02)	0.32	**0.01**	(0.00, 0.02)	**0.09**
FVC (mL)		PA	31.2	(-17.5, 79.8)	0.21	3.6	(-42.1, 49.4)	0.87	16.2	(-23.9, 56.3)	0.42
	CA1	High TRAP site	-3.2	(-49.1, 42.7)	0.89	30.2	(-13.0, 73.3)	0.17	15.2	(-22.7, 53.0)	0.43
		Rest & LT	-1.7	(-66.5, 63.1)	0.96	-37.7	(-98.6, 23.2)	0.22	-21.7	(-75.0, 31.7)	0.42
		PA & HT	26.4	(-39.2, 92.0)	0.43	-3.6	(-65.3, 58.0)	0.91	10.0	(-44.1, 64.0)	0.71
	CA2	PA & LT	34.6	(-34.1, 103.4)	0.32	-26.1	(-90.7, 38.6)	0.42	1.4	(-55.3, 58.0)	0.96
	IA1	PA*Exp.	-10.0	(-101.7, 81.8)	0.83	-15.3	(-101.6, 71.0)	0.73	-13.1	(-88.7, 62.5)	0.73
	IA2	PA*Pre-exp.	-0.1	(-1.68, 1.38)	0.85	1.0	(-0.44, 2.41)	0.17	0.5	(-0.76, 1.75)	0.44
	IA3	Exp.*Pre-exp.	-0.5	(-1.98, 0.93)	0.47	-0.7	(-2.01, 0.71)	0.35	-0.59	(-1.79, 0.60)	0.33
$FEF_{25-75\%}$ (mL/s)		PA	79.5	(-10.6, 169.6)	**0.08**	52.09	(-63.8, 168.0)	0.37	74.9	(-8.6, 158.4)	**0.08**
	CA1	High TRAP site	-8.4	(-93.6, 76.9)	0.85	-4.08	(-113.9, 105.7)	0.94	-8.56	(-87.6, 70.5)	0.83
		Rest & LT	24.0	(-96.4, 144.4)	0.69	7.9	(-147.2, 163.1)	0.92	19.13	(-92.5, 130.7)	0.73
		PA & HT	94.5	(-27.3, 216.2)	0.13	55.7	(-101.2, 212.5)	0.48	85.0	(-27.9, 197.9)	0.14
	CA2	PA & LT	86.9	(-40.4, 214.2)	0.18	55.7	(-108.2, 219.5)	0.50	82.8	(-35.3, 200.8)	0.17
	IA1	PA*Exp.	31.6	(-138.9, 202.0)	0.71	7.9	(-211.7, 227.6)	0.94	21.4	(-136.6, 179.4)	0.79
	IA2	PA*Pre-exp.	-1.25	(-4.07, 1.58)	0.38	0.68	(-2.97, 4.33)	0.71	-0.64	(-3.27, 1.99)	0.63
	IA3	Exp.*Pre-exp.	1.83	(-0.85, 4.50)	0.18	1.49	(-1.98, 4.96)	0.39	1.76	(-0.72, 4.23)	0.16

Stability analysis: A covariate for the PA-level during the free living period was added to all models. **Description of models:** CA1: Adjusting for PA- and Exposure-status. CA2: Using categorical variable for scenario with "Rest & HT" as a reference. IA1-IA3: Interaction models assessing interactions between PA-status, Exposure-status and NO_2 pre-exposure. **Abbreviations:** Exp., Exposure status; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; HT, High traffic site; LT, Low traffic site; p, p-value; PA, Physical activity (status); PEF, Peak expiratory flow; Pre-exp., Participants address-modeled NO_2 pre-exposure one day prior to study days; RM, Respiratory measure; 95% CI, Approximated 95% confidence interval for

Table S20: Stability analysis for associations between respiratory outcomes, physical activity, pollutants and pre-exposure (inclusion of a covariate for the PA-level during the free-living period)

		Time point 1 (T_1)										Time Point 2 (T_2)										Pooled T_1 and T_2									
		CO1			IA1		IA2		IA3			CO1			IA1		IA2		IA3			CO1			IA1		IA2		IA3		
	Estimate SP	Coef.	95% CI	p	Coef.	p	Coef.	p	Coef.	p		Coef.	95% CI	p	Coef.	p	Coef.	p	Coef.	p		Coef.	95% CI	p	Coef.	p	Coef.	p	Coef.	p	
PEF (L/min)	NO_x (ppm)	-5.04	(-23.3, 13.2)	0.58	1.26	0.17	0.002	0.88	0.44	0.29		13.54	(-0.1, 27.1)	**0.05**	E	-1.00	0.14	0.00	0.66	-0.17	0.58	7.72	(-4.5, 19.9)	0.21	-0.36	0.56	0.00	0.63	0.02	0.95	
	NO (ppm)	-5.46	(-26.0, 15.1)	0.60	1.45	0.17	0.001	0.90	0.49	0.33		14.26	(-1.1, 29.6)	**0.07**		-1.42	**0.07**	0.00	0.60	-0.28	0.46	8.01	(-5.8, 21.8)	0.25	-0.61	0.40	0.00	0.59	-0.04	0.91	
	BC (10*µg/m^3)	-0.59	(-5.4, 4.2)	0.81	0.41	0.12	0.001	0.92	0.16	0.17		3.24	(-0.4, 6.8)	**0.08**		-0.29	0.14	0.00	0.60	-0.13	0.13	2.1	(-1.2, 5.3)	0.21	-0.09	0.62	0.00	0.59	-0.04	0.60	
	UFP (10^5*cm^{-3})	-0.19	(-1.13, 0.74)	0.68	0.07	0.18	0.001	0.91	0.02	0.36		0.59	(-0.11, 1.30)	**0.10**		-0.06	0.10	0.00	0.60	-0.01	0.38	0.34	(-0.29, 0.97)	0.29	-0.02	0.47	0.00	0.58	0.00	0.82	
	$PM_{2.5}$ (µg/m^3)	-0.06	(-0.32, 0.21)	0.67	0.02	**0.05**	0.002	0.89	0.008	**0.08**	B	0.15	(-0.05, 0.35)	0.13		-0.01	0.45	0.00	0.64	-0.01	0.17	0.09	(-0.09, 0.27)	0.32	0.002	0.76	0.00	0.61	0.00	0.82	
	PM_{10} (µg/m^3)	-0.05	(-0.21, 0.12)	0.58	0.02	**0.02**	0.002	0.87	0.008	**0.01**	C	0.05	(-0.08, 0.17)	0.45		0.00	0.83	0.00	0.60	0.00	0.11	0.02	(-0.09, 0.13)	0.68	0.00	0.35	0.00	0.58	0.00	0.90	
	PM_{coarse} (µg/m^3)	-0.09	(-0.43, 0.26)	0.62	0.03	**0.02**	0.002	0.87	0.014	**0.004**		-0.05	(-0.32, 0.22)	0.71		0.01	0.57	0.01	0.50	0.00	0.24	-0.04	(-0.28, 0.19)	0.73	0.01	0.13	0.01	0.51	0.00	0.58	
FEV_1 (mL)	NO_x (ppm)	-34.6	(-93.8, 24.7)	0.25	-0.97	0.75	-0.04	0.29	0.32	0.82		32.5	(-31.9, 96.9)	0.32		0.06	0.99	0.02	0.67	0.21	0.89	-6.7	(-59.6, 46.2)	0.80	-0.58	0.83	-0.02	0.63	0.30	0.80	
	NO (ppm)	-31.7	(-98.6, 35.1)	0.35	-0.47	0.89	-0.04	0.27	0.47	0.78		35.1	(-37.4, 107.6)	0.34		-0.30	0.94	0.02	0.64	-0.12	0.95	-3.8	(-63.4, 55.8)	0.90	-0.43	0.89	-0.02	0.62	0.25	0.87	
	BC (10*µg/m^3)	-5.97	(-21.7, 9.7)	0.45	-0.48	0.58	-0.04	0.26	0.29	0.44		9.30	(-7.7, 26.3)	0.28		-0.19	0.84	0.02	0.64	-0.22	0.58	0.5	(-13.5, 14.5)	0.94	-0.38	0.62	-0.02	0.62	0.07	0.83	
	UFP (10^5*cm^{-3})	-1.29	(-4.35, 1.77)	0.40	-0.02	0.90	-0.04	0.26	0.01	0.94		1.78	(-1.53, 5.09)	0.29		-0.08	0.65	0.02	0.64	-0.04	0.58	0.00	(-2.73, 2.72)	1.00	-0.05	0.74	-0.02	0.62	-0.01	0.83	
	$PM_{2.5}$ (µg/m^3)	-0.55	(-1.42, 0.31)	0.21	-0.03	0.41	-0.04	0.30	0.00	0.96		0.38	(-0.56, 1.33)	0.42		-0.01	0.84	0.02	0.66	-0.01	0.58	-0.17	(-0.94, 0.61)	0.67	-0.02	0.50	-0.02	0.64	0.00	0.74	
	PM_{10} (µg/m^3)	-0.50	(-1.02, 0.02)	**0.06**	-0.01	0.63	-0.04	0.35	0.00	0.70		0.012	(-0.56, 0.59)	0.97		0.01	0.80	0.02	0.60	-0.01	0.36	-0.29	(-0.76, 0.17)	0.21	-0.004	0.82	-0.01	0.71	0.00	0.82	
	PM_{coarse} (µg/m^3)	-1.34	(-2.45, -0.23)	**0.02**	A	0.001	0.98	-0.03	0.38	0.02	0.28	-0.61	(-1.85, 0.63)	0.33		0.04	0.37	0.03	0.50	-0.01	0.47	-1.03	(-2.03, -0.04)	**0.04**	A	0.02	0.66	-0.01	0.80	0.00	0.74	
FEV_1/FVC (%)	NO_x (ppm)	-0.36	(-1.02, 0.30)	0.28	0.01	0.76	-0.001	**0.09**	D	0.03	**0.06**	-0.028	(-0.77, 0.71)	0.94		-0.03	0.45	0.00	0.50	0.01	0.41	-0.226	(-0.78, 0.33)	0.42	-0.006	0.82	-0.001	0.13	D 0.02	**0.07**	
	NO (ppm)	-0.53	(-1.27, 0.21)	0.16	0.02	0.54	-0.001	**0.08**		0.03	**0.07**	-0.039	(-0.87, 0.80)	0.93		-0.04	0.41	0.00	0.50	0.02	0.46	-0.331	(-0.96, 0.29)	0.29	-0.002	0.96	-0.001	0.12	0.03	**0.09**	
	BC (10*µg/m^3)	-0.08	(-0.25, 0.10)	0.38	0.01	0.60	-0.001	**0.08**		0.012	**0.004**	C	0.012	(-0.18, 0.21)	0.90		-0.01	0.32	0.00	0.49	0.00	0.65	-0.039	(-0.19, 0.11)	0.60	-0.002	0.82	-0.001	0.12	0.01	**0.02**	C
	UFP (10^5*cm^{-3})	-0.02	(-0.06, 0.01)	0.19	0.00	0.61	-0.001	**0.08**		0.002	**0.04**		-0.003	(-0.04, 0.04)	0.87		0.00	0.22	0.00	0.51	0.00	0.53	-0.015	(-0.04, 0.01)	0.31	-0.001	0.71	-0.001	0.12	0.0012	**0.07**	
	$PM_{2.5}$ (µg/m^3)	0.00	(-0.01, 0.01)	0.59	0.00	0.89	-0.001	**0.08**		0.0004	**0.03**		0.000	(-0.01, 0.01)	0.99		0.00	0.26	0.00	0.50	0.00	0.43	-0.001	(-0.01, 0.01)	0.76	0.000	0.58	-0.001	0.12	0.0003	**0.05**	
	PM_{10} (µg/m^3)	0.00	(-0.01, 0.01)	0.92	0.00	0.97	-0.001	**0.07**		0.0002	**0.02**		0.000	(-0.01, 0.01)	0.98		0.00	0.25	0.00	0.49	0.00	0.65	0.00	(0.00, 0.01)	0.96	0.000	0.51	-0.001	0.11	0.0002	**0.06**	
	PM_{coarse} (µg/m^3)	0.004	(-0.01, 0.02)	0.54	0.00	0.71	-0.001	**0.06**		0.00	0.12		0.000	(-0.01, 0.01)	0.97		0.00	0.34	0.00	0.49	0.00	0.96	0.00	(-0.01, 0.01)	0.55	0.000	0.46	-0.001	**0.09**	0.0002	0.29	
FVC (mL)	NO_x (ppm)	-17	(-84.6, 50.7)	0.62	-1.90	0.58	-0.01	0.80	-0.91	0.56		32.9	(-31.6, 97.4)	0.31		-0.017	1	0.05	0.27	-0.67	0.65	10.0	(-46.1, 66.1)	0.72	-0.93	0.74	0.02	0.59	-0.76	0.55	
	NO (ppm)	-5.94	(-82.2, 70.3)	0.88	-2.15	0.59	-0.01	0.76	-1.02	0.59		37.1	(-35.4, 109.7)	0.31		-0.477	0.9	0.05	0.26	-1.28	0.48	17.4	(-45.7, 80.4)	0.59	-1.28	0.70	0.02	0.58	-1.13	0.47	
	BC (10*µg/m^3)	-2.26	(-20.1, 15.6)	0.80	-0.88	0.36	-0.01	0.77	-0.20	0.63		8.12	(-8.9, 25.2)	0.35		-0.102	0.91	0.05	0.25	-0.45	0.27	3.3	(-11.4, 18.1)	0.65	-0.49	0.54	0.02	0.58	-0.34	0.34	
	UFP (10^5*cm^{-3})	-0.14	(-3.63, 3.34)	0.94	-0.10	0.59	-0.01	0.76	-0.07	0.41		1.96	(-1.35, 5.27)	0.24		-0.059	0.73	0.05	0.26	-0.10	0.21	0.99	(-1.89, 3.87)	0.49	-0.08	0.60	0.02	0.59	-0.08	0.22	
	$PM_{2.5}$ (µg/m^3)	-0.44	(-1.43, 0.55)	0.37	-0.04	0.39	-0.01	0.83	-0.02	0.26		0.36	(-0.59, 1.31)	0.46		0.002	0.97	0.05	0.26	-0.02	0.21	-0.02	(-0.84, 0.81)	0.97	-0.02	0.63	0.02	0.56	-0.02	0.15	
	PM_{10} (µg/m^3)	-0.54	(-1.13, 0.05)	**0.07**	0.00	0.92	0.00	0.94	-0.01	0.50		-0.04	(-0.62, 0.54)	0.90		0.019	0.43	0.05	0.22	-0.02	0.14	-0.28	(-0.77, 0.22)	0.27	0.01	0.70	0.03	0.48	-0.01	0.18	
	PM_{coarse} (µg/m^3)	-1.71	(-2.96, -0.47)	**0.01**	A	0.04	0.37	0.00	0.95	0.01	0.69	-0.79	(-2.03, 0.45)	0.21		0.08	**0.09**	B	0.06	0.16	-0.02	0.31	-1.24	(-2.29, -0.20)	**0.02**	A	0.061	0.13	0.03	0.38	-0.01	0.67	

Description of models: Model CO1 with continous variables for PA and exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models. **Comments:** Major findings are pointed out with A-E.

11) Stability analysis: Model results for relative changes

Table S21: Model outcomes using %changes compared to baseline as dependent variable without basline in RE-term

RM	Model	Estimate	Time point 1 (T_1)			Time Point 2 (T_2)			Pooled T_1 and T_2		
			Coeff.	95% CI	p	Coeff.	95% CI	p	Coeff.	95% CI	p
PEF (%Change)		PA	2.0	(-0.52, 4.44)	0.12	0.4	(-2.02, 2.83)	0.74	**1.2**	(-0.48, 2.86)	0.16
	CA1	High TRAP site	-0.6	(-3.13, 1.84)	0.61	1.1	(-1.37, 3.48)	0.39	0.2	(-1.48, 1.86)	0.83
		Rest & LT	0.9	(-2.65, 4.43)	0.62	**-4.6**	**(-7.85, -1.27)**	**0.01**	-1.80	(-4.15, 0.56)	0.13
		PA & HT	2.2	(-1.32, 5.73)	0.22	-3.1	(-6.34, 0.21)	**0.07**	-0.4	(-2.75, 1.94)	0.73
	CA2	PA & LT	2.6	(-0.90, 6.12)	0.14	-0.7	(-3.95, 2.56)	0.67	1.0	(-1.35, 3.31)	0.41
	IA1	PA*Exp.	0.5	(-4.49, 5.46)	0.85	**-6.9**	**(-11.55, -2.31)**	**0.004**	-3.2	(-6.48, 0.13)	**0.06**
	IA2	PA*Pre-exp.	-0.03	(-0.11, 0.05)	0.49	-0.01	(-0.09, 0.07)	0.73	-0.02	(-0.08, 0.03)	0.42
	IA3	Exp.*Pre-exp.	0.04	(-0.04, 0.11)	0.34	-0.01	(-0.08, 0.07)	0.85	0.01	(-0.04, 0.06)	0.66
FEV_1 (%Change)		PA	**1.4**	**(0.63, 2.17)**	**0.001**	0.5	(-0.77, 1.67)	0.46	**0.9**	**(0.18, 1.66)**	**0.02**
	CA1	High TRAP site	**-0.8**	**(-1.56, -0.01)**	**0.05**	0.3	(-0.96, 1.48)	0.67	-0.3	(-1.00, 0.48)	0.48
		Rest & LT	-0.3	(-1.34, 0.77)	0.59	-1.6	(-3.30, 0.07)	**0.06**	-0.95	(-1.98, 0.07)	**0.07**
		PA & HT	0.3	(-0.71, 1.39)	0.52	-0.9	(-2.58, 0.78)	0.29	-0.3	(-1.30, 0.74)	0.59
	CA2	PA & LT	**2.2**	**(1.13, 3.21)**	**0.0001**	0.2	(-1.50, 1.84)	0.84	**1.2**	**(0.15, 2.19)**	**0.02**
	IA1	PA*Exp.	**-2.12**	**(-3.60, -0.63)**	**0.01**	**-2.7**	**(-5.06, -0.32)**	**0.03**	**-2.4**	**(-3.84, -0.96)**	**0.001**
	IA2	PA*Pre-exp.	-0.01	(-0.04, 0.01)	0.38	0.01	(-0.03, 0.05)	0.52	0.0001	(-0.02, 0.02)	0.99
	IA3	Exp.*Pre-exp.	-0.01	(-0.03, 0.02)	0.48	-0.005	(-0.04, 0.03)	0.80	-0.01	(-0.03, 0.02)	0.52
FEV1/FVC (%Change)		PA	**0.67**	**(0.04, 1.31)**	**0.04**	0.13	(-0.65, 0.90)	0.15	0.39	(-0.10, 0.88)	0.12
	CA1	High TRAP site	-0.09	(-0.72, 0.55)	0.78	0.13	(-0.64, 0.91)	0.15	0.02	(-0.47, 0.51)	0.95
		Rest & LT	-0.42	(-1.31, 0.47)	0.35	-0.79	(-1.88, 0.30)	0.15	-0.59	(-1.28, 0.09)	**0.09**
		PA & HT	0.17	(-0.72, 1.06)	0.70	-0.52	(-1.61, 0.56)	0.34	-0.18	(-0.86, 0.51)	0.61
	CA2	PA & LT	0.76	(-0.13, 1.64)	**0.09**	-0.01	(-1.09, 1.07)	0.98	0.37	(-0.31, 1.05)	0.28
	IA1	PA*Exp.	-1.00	(-2.26, 0.25)	0.12	-1.30	(-2.83, 0.23)	**0.09**	**-1.14**	**(-2.11, -0.17)**	**0.02**
	IA2	PA*Pre-exp.	0.00	(-0.02, 0.02)	0.71	0.01	(-0.02, 0.03)	0.66	0.0005	(-0.02, 0.02)	0.95
	IA3	Exp.*Pre-exp.	0.01	(-0.01, 0.03)	0.42	0.00	(-0.02, 0.03)	0.73	0.01	(-0.01, 0.02)	0.51
FVC (%Change)		PA	0.6	(-0.18, 1.45)	0.12	0.3	(-0.80, 1.37)	0.61	0.5	(-0.20, 1.14)	0.17
	CA1	High TRAP site	-0.7	(-1.50, 0.14)	**0.10**	0.03	(-1.06, 1.12)	0.95	-0.3	(-0.99, 0.36)	0.36
		Rest & LT	-0.1	(-1.27, 1.00)	0.81	-1.0	(-2.53, 0.51)	0.19	-0.6	(-1.53, 0.35)	0.21
		PA & HT	-0.2	(-1.30, 0.96)	0.77	-0.7	(-2.21, 0.82)	0.37	-0.4	(-1.36, 0.51)	0.37
	CA2	PA & LT	**1.3**	**(0.19, 2.43)**	**0.02**	0.2	(-1.27, 1.74)	0.75	0.8	(-0.16, 1.70)	**0.10**
	IA1	PA*Exp.	**-1.6**	**(-3.21, -0.02)**	**0.05**	-1.9	(-4.07, 0.20)	**0.08**	**-1.8**	**(-3.11, -0.47)**	**0.01**
	IA2	PA*Pre-exp.	-0.01	(-0.04, 0.01)	0.33	0.005	(-0.03, 0.04)	0.79	-0.01	(-0.03, 0.02)	0.63
	IA3	Exp.*Pre-exp.	-0.01	(-0.04, 0.02)	0.42	-0.004	(-0.04, 0.03)	0.81	-0.01	(-0.03, 0.01)	0.48
$FEF_{25-75\%}$ (%Change)		PA	**3.7**	**(1.12, 6.27)**	**0.01**	1.80	(-1.46, 5.06)	0.28	**2.7**	**(0.63, 4.85)**	**0.01**
	CA1	High TRAP site	-0.6	(-3.19, 1.96)	0.64	-0.62	(-3.89, 2.64)	0.71	-0.62	(-2.73, 1.49)	0.56
		Rest & LT	-2.0	(-5.60, 1.57)	0.27	-3.4	(-7.87, 1.12)	0.14	-2.69	(-5.62, 0.24)	**0.07**
		PA & HT	1.1	(-2.48, 4.66)	0.55	-2.2	(-6.65, 2.30)	0.34	-0.5	(-3.46, 2.38)	0.71
	CA2	PA & LT	**4.3**	**(0.73, 7.83)**	**0.02**	2.4	(-2.08, 6.83)	0.29	**3.3**	**(0.42, 6.22)**	**0.03**
	IA1	PA*Exp.	**-5.2**	**(-10.24, -0.17)**	**0.04**	**-7.9**	**(-14.23, -1.61)**	**0.02**	**-6.6**	**(-10.67, -2.43)**	**0.002**
	IA2	PA*Pre-exp.	-0.02	(-0.10, 0.07)	0.72	0.01	(-0.10, 0.12)	0.84	-0.004	(-0.07, 0.07)	0.92
	IA3	Exp.*Pre-exp.	0.02	(-0.06, 0.10)	0.57	0.02	(-0.08, 0.12)	0.71	0.02	(-0.05, 0.09)	0.57

Description of models: CA1: Adjusting for PA- and Exposure-status. CA2: Using categorical variable for scenario with "Rest & HT" as a reference. IA1-IA3: Interaction models assessing interactions between PA-status, Exposure-status and NO_2 pre-exposure. **Abbreviations:** Exp., Exposure status; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; HT, High traffic site; LT, Low traffic site; p, p-value; PA, Physical activity (status); PEF, Peak expiratory flow; Pre-exp., Participants address-modeled NO_2 pre-exposure one day prior to study days; RE, Random effects; 95% CI, Approximated 95% confidence interval for mixed-effects models.

Table S22: Model outcomes using %Change compared to baseline as dependent variable without basline in RE-term

		Time point 1 (T_1)								Time Point 2 (T_2)								Pooled T_1 and T_2							
		CO1			IA1		IA2		IA3				CO1			IA1		IA2		IA3				IA1		IA2		IA3	
	Estimate SP	Coeff.	95% CI	p	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	95% CI	p	Coeff.	p	Coeff.	p	Coeff.	p	Coef	95% CI	p	Coeff.	p	Coeff.	p	Coeff.	p
PEF (%Change)	NO_x (ppm)	-1.31	(-5.00, 2.37)	0.48	-0.003	0.99	-0.002	0.44	-0.02	0.84	2.07	(-1.55, 5.69)	0.26	-0.43	**0.02**	-0.003	0.25	-0.11	0.17	0.31	(-2.19, 2.81)	0.81	-0.22	**0.08**	-0.002	0.16	-0.06	0.31
	NO (ppm)	-1.26	(-5.41, 2.90)	0.55	0.034	0.87	-0.002	0.43	0.01	0.94	2.45	(-1.62, 6.53)	0.23	-0.53	**0.01**	-0.003	0.27	-0.12	0.24	0.48	(-2.33, 3.30)	0.74	-0.25	**0.08**	-0.002	0.16	-0.05	0.45
	BC (10*µg/m^3)	-0.19	(-1.45, 1.06)	0.76	0.010	0.88	-0.002	0.42	0.02	0.54	0.63	(-0.60, 1.86)	0.31	-0.16	**0.01**	-0.003	0.28	-0.05	**0.07**	0.19	(-0.66, 1.03)	0.67	-0.08	**0.10**	-0.002	0.16	-0.02	0.31
	UFP (10^5*cm^{-3})	-0.05	(-0.24, 0.14)	0.60	-0.002	0.86	-0.002	0.43	0.002	0.72	0.09	(-0.09, 0.28)	0.33	-0.03	**0.01**	-0.003	0.28	-0.005	0.28	0.02	(-0.11, 0.15)	0.80	-0.01	**0.03**	-0.002	0.16	-0.002	0.59
	$PM_{2.5}$ (µg/m^3)	0.01	(-0.05, 0.06)	0.83	-0.001	0.808	-0.002	0.40	0.002	**0.03**	0.03	(-0.02, 0.08)	0.25	-0.01	**0.01**	-0.003	0.25	-0.001	0.36	0.01	(-0.02, 0.05)	0.42	-0.003	**0.04**	-0.002	0.14	0.0004	0.54
	PM_{10} (µg/m^3)	0.001	(-0.03, 0.03)	0.96	0.00003	0.98	-0.002	0.40	0.001	**0.01**	0.01	(-0.02, 0.04)	0.57	0.00	**0.04**	-0.003	0.26	-0.001	0.15	0.003	(-0.02, 0.02)	0.77	-0.001	0.16	-0.002	0.15	0.0002	0.67
	PM_{coarse} (µg/m^3)	-0.001	(-0.06, 0.06)	0.97	0.001	0.80	-0.002	0.41	0.002	**0.03**	-0.01	(-0.07, 0.06)	0.81	0.00	0.39	-0.002	0.32	-0.001	0.17	-0.01	(-0.05, 0.04)	0.75	-0.001	0.72	-0.002	0.18	0.0002	0.77
FEV_1 (%Change)	NO_x (ppm)	-1.03	(-2.20, 0.14)	**0.08**	-0.15	**0.01**	-0.001	0.30	-0.06	**0.01**	0.6	(-1.25, 2.39)	0.53	-0.14	0.12	0.0003	0.76	-0.05	0.18	-0.2	(-1.31, 0.91)	0.72	-0.15	**0.01**	-0.0003	0.68	-0.06	**0.02**
	NO (ppm)	-1.15	(-2.46, 0.17)	**0.09**	-0.15	**0.02**	-0.001	0.27	-0.08	**0.02**	0.4	(-1.63, 2.48)	0.68	-0.17	0.10	0.0004	0.74	-0.08	0.13	-0.3	(-1.60, 0.91)	0.59	-0.17	**0.01**	-0.0003	0.68	-0.08	**0.01**
	BC (10*µg/m^3)	-0.38	(-0.78, 0.01)	**0.06**	-0.06	**0.004**	-0.001	0.27	-0.02	**0.04**	0.04	(-0.58, 0.66)	0.91	-0.06	**0.06**	0.0004	0.72	-0.03	**0.03**	-0.2	(-0.55, 0.20)	0.37	-0.06	**0.002**	-0.0003	0.69	-0.03	**0.003**
	UFP (10^5*cm^{-3})	-0.06	(-0.12, 0.00)	**0.05**	-0.01	**0.02**	-0.001	0.27	-0.003	**0.05**	0.01	(-0.08, 0.10)	0.85	-0.01	**0.04**	0.0004	0.73	-0.003	0.13	-0.03	(-0.08, 0.03)	0.38	-0.01	**0.003**	-0.0003	0.69	-0.003	**0.02**
	$PM_{2.5}$ (µg/m^3)	-0.02	(-0.03, 0.00)	**0.04**	-0.002	**0.001**	-0.001	0.31	-0.0004	0.16	0.004	(-0.02, 0.03)	0.79	-0.002	**0.06**	0.0004	0.74	-0.0004	0.37	-0.01	(-0.02, 0.01)	0.40	0.00	**0.001**	-0.0003	0.72	-0.001	**0.10**
	PM_{10} (µg/m^3)	-0.01	(-0.02, 0.00)	**0.02**	-0.001	**0.002**	-0.001	0.36	-0.0002	0.27	-0.003	(-0.02, 0.01)	0.72	-0.001	**0.08**	0.0005	0.68	-0.0004	0.13	-0.01	(-0.02, 0.00)	0.13	-0.001	**0.002**	-0.0002	0.82	-0.0003	**0.04**
	PM_{coarse} (µg/m^3)	-0.02	(-0.05, 0.00)	**0.02**	-0.002	**0.03**	-0.001	0.37	-0.0001	0.86	-0.02	(-0.05, 0.02)	0.29	-0.002	0.23	0.0006	0.59	-0.001	0.16	-0.02	(-0.04, 0.00)	**0.04**	0.00	**0.03**	-0.0001	0.90	-0.0004	0.13
FEV_1/FVC (%Change)	NO_x (ppm)	-0.09	(-1.05, 0.86)	0.84	-0.06	0.24	-0.0002	0.73	0.01	0.58	0.259	(-0.89, 1.41)	0.66	-0.11	**0.06**	0.0003	0.67	-0.01	0.82	0.127	(-0.61, 0.86)	0.73	-0.082	**0.03**	-0.0001	0.90	0.0012	0.94
	NO (ppm)	-0.17	(-1.25, 0.90)	0.75	-0.06	0.30	-0.0002	0.73	0.02	0.54	0.385	(-0.91, 1.68)	0.56	-0.14	**0.04**	0.0003	0.67	-0.005	0.87	0.140	(-0.69, 0.97)	0.74	-0.097	**0.02**	-0.0001	0.91	0.0033	0.87
	BC (10*µg/m^3)	-0.0005	(-0.32, 0.32)	1.00	-0.02	0.36	-0.0002	0.71	0.008	0.29	0.106	(-0.29, 0.50)	0.59	-0.04	**0.05**	0.0003	0.66	-0.004	0.64	0.060	(-0.19, 0.31)	0.64	-0.028	**0.04**	-0.0001	0.91	0.0009	0.87
	UFP (10^5*cm^{-3})	-0.01	(-0.06, 0.04)	0.64	-0.003	0.22	-0.0002	0.73	0.001	0.40	0.012	(-0.05, 0.07)	0.69	-0.01	**0.01**	0.0003	0.66	-0.0003	0.85	0.001	(-0.04, 0.04)	0.95	-0.005	**0.01**	-0.00005	0.92	0.0003	0.76
	$PM_{2.5}$ (µg/m^3)	0.002	(-0.01, 0.02)	0.75	-0.001	0.37	-0.0002	0.69	0.0004	0.13	0.003	(-0.01, 0.02)	0.71	0.00	**0.07**	0.0003	0.67	0.0002	0.49	0.003	(-0.01, 0.01)	0.53	-0.001	**0.05**	-0.0001	0.87	0.0002	0.20
	PM_{10} (µg/m^3)	0.002	(-0.01, 0.01)	0.58	0.000	0.47	-0.0003	0.65	0.0002	0.18	0.000	(-0.01, 0.01)	0.95	0.00	0.13	0.0003	0.65	0.0001	0.60	0.002	(0.00, 0.01)	0.56	-0.0004	0.11	-0.0001	0.86	0.0001	0.31
	PM_{coarse} (µg/m^3)	0.007	(-0.01, 0.02)	0.40	0.000	0.63	-0.0003	0.61	0.000	0.46	-0.003	(-0.02, 0.02)	0.76	0.00	0.37	0.0004	0.60	0.0001	0.72	0.003	(-0.01, 0.02)	0.64	-0.001	0.34	-0.0001	0.86	0.0001	0.61
FVC (%Change)	NO_x (ppm)	-0.91	(-2.13, 0.30)	0.14	-0.10	**0.09**	-0.001	0.28	-0.06	**0.03**	0.1	(-1.50, 1.75)	0.88	-0.062	0.45	0.0001	0.92	-0.04	0.31	-0.4	(-1.37, 0.64)	0.47	-0.09	**0.08**	-0.0004	0.51	-0.05	**0.04**
	NO (ppm)	-0.93	(-2.30, 0.44)	0.18	-0.10	0.15	-0.001	0.26	-0.07	**0.03**	-0.1	(-1.96, 1.70)	0.89	-0.073	0.44	0.0001	0.90	-0.06	0.18	-0.5	(-1.65, 0.61)	0.37	-0.09	0.115	-0.0004	0.49	-0.06	**0.02**
	BC (10*µg/m^3)	-0.36	(-0.77, 0.06)	**0.09**	-0.05	**0.03**	-0.001	0.26	-0.02	**0.06**	-0.12	(-0.67, 0.43)	0.68	-0.031	0.29	0.0001	0.89	-0.02	0.11	-0.2	(-0.57, 0.11)	0.18	-0.04	**0.02**	-0.0004	0.51	-0.02	**0.01**
	UFP (10^5*cm^{-3})	-0.05	(-0.11, 0.01)	0.12	-0.005	0.14	-0.001	0.26	-0.0026	**0.07**	-0.01	(-0.10, 0.07)	0.77	-0.004	0.34	0.0001	0.90	-0.002	0.20	-0.03	(-0.08, 0.02)	0.25	-0.005	**0.077**	-0.0004	0.50	-0.003	**0.04**
	$PM_{2.5}$ (µg/m^3)	-0.02	(-0.03, 0.00)	**0.06**	-0.002	**0.01**	-0.001	0.30	-0.0004	0.16	-0.001	(-0.02, 0.02)	0.90	-0.001	0.23	0.0001	0.90	-0.0004	0.35	-0.01	(-0.02, 0.01)	0.20	-0.002	**0.009**	-0.0004	0.54	-0.001	**0.06**
	PM_{10} (µg/m^3)	-0.01	(-0.02, 0.00)	**0.03**	-0.001	**0.02**	-0.001	0.35	-0.0001	0.40	-0.004	(-0.02, 0.01)	0.61	-7E-04	0.26	0.0002	0.85	-0.0003	0.17	-0.01	(-0.02, 0.00)	**0.08**	-0.001	**0.017**	-0.0003	0.62	-0.0003	**0.04**
	PM_{coarse} (µg/m^3)	-0.02	(-0.04, 0.00)	**0.04**	-0.001	0.13	-0.001	0.35	0.0001	0.87	-0.01	(-0.04, 0.02)	0.38	-9E-04	0.43	0.0003	0.80	-0.0005	0.21	-0.02	(-0.04, 0.00)	**0.04**	-0.001	**0.099**	-0.0003	0.67	-0.0003	0.18

Description of models: Model CO1 with continous variables for PA and Exposure. Interaction models IA1-IA3 were designed to examine interations between PA and single pollutants (IA1), PA and NO_2 pre-exposure (IA2) and single pollutnats and NO_2-pre-exposure (IA3), respectively. **Abbreviations:** BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; IA, Interaction; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; RE, Random effects; 95% CI, Approximated 95% confidence interval for mixed-effects models.

12) Detailed model outcomes

Single pollutant model CO1

Table S23: Singel pollutant model using continous covariates for exposure and physical activity

		Time Point 1			Time Point 2				Time Point 1			Time Point 2		
Estimate		Coeff.	95% CI	p	Coeff.	95% CI	p		Coeff.	95% CI	p	Coeff.	95% CI	p
pa	PEF (L/min)	0.5	(-0.16, 1.12)	0.14	0.1	(-0.35, 0.61)	0.60	FEV$_1$ (mL)	**3.0**	**(0.96, 5.13)**	**0.01**	0.7	(-1.59, 2.99)	0.54
NO_x (ppm)		-4.9	(-23.1, 13.2)	0.59	**13.6**	**(0.1, 27.1)**	**0.05**		-34.5	(-93.3, 24.3)	0.25	34.6	(-30.0, 99.1)	0.29
NO_2 pre-exp.		0.2	(-0.17, 0.49)	0.34	0.1	(-0.16, 0.35)	0.45		0.4	(-0.75, 1.50)	0.51	0.3	(-0.95, 1.51)	0.65
pa		0.5	(-0.16, 1.12)	0.14	0.1	(-0.36, 0.60)	0.63		**3.1**	**(0.98, 5.16)**	**0.004**	0.7	(-1.61, 2.97)	0.56
NO (ppm)		-5.3	(-25.7, 15.1)	0.61	14.3	(-0.9, 29.6)	0.07		-31.6	(-98.0, 34.7)	0.35	37.8	(-34.9, 110.4)	0.30
NO_2 pre-exp.		0.2	(-0.17, 0.49)	0.34	0.1	(-0.16, 0.35)	0.45		0.4	(-0.75, 1.51)	0.51	0.3	(-0.95, 1.52)	0.65
pa		0.5	(-0.16, 1.13)	0.14	0.1	(-0.38, 0.58)	0.67		**3.1**	**(1.01, 5.20)**	**0.004**	0.6	(-1.64, 2.93)	0.58
BC (10*µg/m^3)		-0.6	(-5.4, 4.2)	0.82	3.3	(-0.3, 6.8)	0.07		-6.0	(-21.6, 9.6)	0.45	9.8	(-7.2, 26.8)	0.25
NO_2 pre-exp.		0.2	(-0.16, 0.50)	0.32	0.1	(-0.19, 0.32)	0.60		0.4	(-0.70, 1.57)	0.45	0.2	(-1.04, 1.43)	0.75
pa		0.48	(-0.16, 1.13)	0.14	0.11	(-0.37, 0.59)	0.65		**3.09**	**(1.00, 5.18)**	**0.004**	0.67	(-1.62, 2.95)	0.56
UFP (10^5*cm^{-3})		-0.19	(-1.12, 0.75)	0.69	0.59	(-0.11, 1.29)	0.10		-1.28	(-4.32, 1.75)	0.40	1.91	(-1.40, 5.23)	0.25
NO_2 pre-exp.		0.17	(-0.16, 0.50)	0.32	0.08	(-0.18, 0.34)	0.53		0.42	(-0.71, 1.55)	0.46	0.23	(-1.00, 1.46)	0.71
pa		0.49	(-0.16, 1.13)	0.14	0.10	(-0.38, 0.58)	0.68		**3.11**	**(1.03, 5.19)**	**0.004**	0.64	(-1.66, 2.93)	0.58
$PM_{2.5}$ (µg/m^3)		-0.06	(-0.32, 0.21)	0.68	0.15	(-0.05, 0.35)	0.13		-0.55	(-1.41, 0.31)	0.21	0.43	(-0.52, 1.38)	0.37
NO_2 pre-exp.		0.19	(-0.16, 0.53)	0.29	0.03	(-0.24, 0.29)	0.85		0.63	(-0.55, 1.80)	0.290	0.08	(-1.22, 1.37)	0.91
pa		0.49	(-0.15, 1.14)	0.13	0.10	(-0.39, 0.59)	0.69		**3.18**	**(1.12, 5.23)**	**0.003**	0.64	(-1.66, 2.95)	0.58
PM_{10} (µg/m^3)		-0.05	(-0.21, 0.11)	0.57	0.05	(-0.08, 0.17)	0.46		-0.50	(-1.02, 0.01)	0.06	0.00	(-0.57, 0.58)	0.99
NO_2 pre-exp.		0.20	(-0.15, 0.56)	0.26	0.05	(-0.23, 0.33)	0.73		0.84	(-0.35, 2.04)	0.160	0.24	(-1.09, 1.58)	0.72
pa		0.50	(-0.15, 1.14)	0.13	0.11	(-0.38, 0.60)	0.65		**3.28**	**(1.24, 5.32)**	**0.002**	0.74	(-1.55, 3.03)	0.52
PM_{coarse} (µg/m^3)		-0.09	(-0.43, 0.25)	0.61	-0.05	(-0.32, 0.21)	0.69		**-1.31**	**(-2.40, -0.21)**	**0.02**	-0.71	(-1.93, 0.52)	0.26
NO_2 pre-exp.		0.20	(-0.16, 0.56)	0.27	0.11	(-0.17, 0.39)	0.44		1.00	(-0.20, 2.20)	0.10	0.57	(-0.78, 1.92)	0.41
pa	FEV$_1$/FVC (%)	**0.033**	**(0.01, 0.06)**	**0.006**	0.006	(-0.02, 0.03)	0.66	FVC (mL)	2.1	(-0.29, 4.48)	0.08	0.5	(-1.73, 2.82)	0.64
NO_x (ppm)		-0.361	(-1.02, 0.30)	0.28	0.003	(-0.75, 0.76)	0.99		-16.1	(-83.3, 51.1)	0.64	33.9	(-30.2, 98.1)	0.30
NO_2 pre-exp.		-0.001	(-0.01, 0.01)	0.870	0.003	(-0.01, 0.02)	0.73		0.7	(-0.57, 2.00)	0.27	0.3	(-0.90, 1.56)	0.59
pa		**0.033**	**(0.01, 0.06)**	**0.006**	0.006	(-0.02, 0.03)	0.66		2.1	(-0.26, 4.51)	0.08	0.5	(-1.75, 2.79)	0.65
NO (ppm)		-0.529	(-1.27, 0.21)	0.16	0.002	(-0.84, 0.85)	1.00		-4.8	(-80.5, 70.9)	0.90	38.5	(-33.7, 110.6)	0.29
NO_2 pre-exp.		-0.001	(-0.01, 0.01)	0.840	0.003	(-0.01, 0.02)	0.73		0.7	(-0.57, 2.01)	0.27	0.3	(-0.89, 1.57)	0.59
pa		**0.034**	**(0.01, 0.06)**	**0.005**	0.006	(-0.02, 0.03)	0.66		2.1	(-0.26, 4.51)	0.08	0.5	(-1.79, 2.75)	0.68
BC (10*µg/m^3)		-0.078	(-0.25, 0.10)	0.38	0.020	(-0.18, 0.22)	0.84		-2.0	(-19.8, 15.7)	0.82	8.4	(-8.6, 25.3)	0.33
NO_2 pre-exp.		0.000	(-0.01, 0.01)	0.960	0.002	(-0.01, 0.02)	0.74		0.7	(-0.55, 2.03)	0.26	0.3	(-0.97, 1.49)	0.68
pa		**0.034**	**(0.01, 0.06)**	**0.005**	0.006	(-0.02, 0.03)	0.66		2.13	(-0.26, 4.51)	0.08	0.50	(-1.76, 2.77)	0.66
UFP (10^5*cm^{-3})		-0.023	(-0.06, 0.01)	0.19	-0.001	(-0.04, 0.04)	0.96		-0.08	(-3.54, 3.37)	0.96	2.02	(-1.27, 5.31)	0.22
NO_2 pre-exp.		-0.001	(-0.01, 0.01)	0.930	0.003	(-0.01, 0.02)	0.72		0.73	(-0.56, 2.02)	0.26	0.28	(-0.94, 1.51)	0.65
pa		**0.034**	**(0.01, 0.06)**	**0.005**	0.006	(-0.02, 0.03)	0.66		2.13	(-0.24, 4.51)	0.08	0.48	(-1.80, 2.75)	0.68
$PM_{2.5}$ (µg/m^3)		-0.003	(-0.01, 0.01)	0.59	0.001	(-0.01, 0.01)	0.89		-0.42	(-1.40, 0.56)	0.39	0.38	(-0.56, 1.32)	0.43
NO_2 pre-exp.		0.000	(-0.01, 0.01)	0.960	0.002	(-0.01, 0.02)	0.77		0.90	(-0.44, 2.24)	0.19	0.15	(-1.14, 1.44)	0.82
pa		**0.034**	**(0.01, 0.06)**	**0.005**	0.006	(-0.02, 0.03)	0.66		2.21	(-0.13, 4.54)	0.06	0.49	(-1.80, 2.78)	0.67
PM_{10} (µg/m^3)		0.000	(-0.01, 0.01)	0.92	0.000	(-0.01, 0.01)	0.99		-0.54	(-1.13, 0.05)	0.07	-0.04	(-0.62, 0.53)	0.89
NO_2 pre-exp.		0.000	(-0.01, 0.01)	0.940	0.003	(-0.01, 0.02)	0.74		1.20	(-0.16, 2.56)	0.08	0.34	(-0.99, 1.67)	0.61
pa		**0.033**	**(0.01, 0.06)**	**0.006**	0.006	(-0.02, 0.03)	0.65		**2.36**	**(0.08, 4.64)**	**0.04**	0.59	(-1.67, 2.86)	0.60
PM_{coarse} (µg/m^3)		0.004	(-0.01, 0.02)	0.53	-0.001	(-0.02, 0.01)	0.85		**-1.71**	**(-2.94, -0.49)**	**0.01**	-0.83	(-2.05, 0.39)	0.18
NO_2 pre-exp.		-0.003	(-0.02, 0.01)	0.720	0.00	(-0.01, 0.02)	0.69		**1.52**	**(0.17, 2.87)**	**0.03**	0.68	(-0.66, 2.02)	0.31
pa	$FEF_{25-75\%}$ (mL/s)	**5.7**	**(1.29, 10.17)**	**0.01**	1.6	(-4.19, 7.49)	0.58							
NO_x (ppm)		-30.9	(-156.1, 94.4)	0.63	-9.6	(-174.4, 155.2)	0.91							
NO_2 pre-exp.		0.2	(-2.20, 2.56)	0.88	0.8	(-2.35, 3.87)	0.63							
pa		**5.7**	**(1.31, 10.19)**	**0.01**	1.7	(-4.17, 7.50)	0.57							
NO (ppm)		-38.1	(-179.0, 102.8)	0.59	-0.7	(-186.1, 184.7)	0.99							
NO_2 pre-exp.		0.2	(-2.20, 2.55)	0.88	0.8	(-2.34, 3.88)	0.62							
pa		**5.8**	**(1.34, 10.23)**	**0.01**	1.7	(-4.17, 7.50)	0.57							
BC (10*µg/m^3)		-1.9	(-35.0, 31.2)	0.91	4.4	(-39.1, 47.9)	0.84							
NO_2 pre-exp.		0.2	(-2.17, 2.60)	0.86	0.7	(-2.37, 3.86)	0.64							
pa		**5.77**	**(1.33, 10.21)**	**0.01**	1.67	(-4.17, 7.50)	0.57							
UFP (10^5*cm^{-3})		-1.49	(-7.93, 4.94)	0.65	0.18	(-8.29, 8.65)	0.97							
NO_2 pre-exp.		0.22	(-2.16, 2.60)	0.85	0.77	(-2.34, 3.87)	0.62							
pa		**5.79**	**(1.35, 10.23)**	**0.01**	1.67	(-4.17, 7.50)	0.57							
$PM_{2.5}$ (µg/m^3)		-0.28	(-2.12, 1.56)	0.76	0.02	(-2.39, 2.43)	0.99							
NO_2 pre-exp.		0.32	(-2.17, 2.81)	0.80	0.76	(-2.49, 4.01)	0.64							
pa		**5.82**	**(1.38, 10.27)**	**0.01**	1.71	(-4.12, 7.55)	0.56							
PM_{10} (µg/m^3)		-0.25	(-1.36, 0.87)	0.66	-0.33	(-1.80, 1.13)	0.65							
NO_2 pre-exp.		0.42	(-2.14, 2.98)	0.750	1.05	(-2.29, 4.39)	0.53							
pa		**5.87**	**(1.42, 10.32)**	**0.01**	1.87	(-3.96, 7.69)	0.53							
PM_{coarse} (µg/m^3)		-0.59	(-2.97, 1.79)	0.62	-1.50	(-4.61, 1.61)	0.34							
NO_2 pre-exp.		0.47	(-2.13, 3.07)	0.72	1.43	(-1.95, 4.81)	0.40							

Abbreviations: BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV_1, Forced expiratory volume in 1 s; FVC, Forced viatal capacity; pa, continous covariate for physical activity; p, p-value ; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models.

Interaction model IA1

Table S24: Interaction model IA1 with continous variables testing the interaction between physical activity and single pollutants

		Time Point 1			Time Point 2				Time Point 1			Time Point 2		
Estimate		Coeff.	95% CI	p	Coeff.	95% CI	p		Coeff.	95% CI	p	Coeff.	95% CI	p
pa	PEF (L/min)	0.5	(-0.1, 1.1)	0.13	0.1	(-0.4, 0.6)	0.63	FEV_1 (mL)	**3.0**	**(0.9, 5.1)**	**0.01**	0.7	(-1.6, 3.0)	0.54
NO_x (ppm)		-2.2	(-20.7, 16.2)	0.81	11.5	(-2.2, 25.2)	0.10		-36.5	(-96.9, 24.0)	0.23	35.4	(-31.0, 101.9)	0.29
pa * NO_x		1.3	(-0.5, 3.1)	0.16	-1.0	(-2.3, 0.4)	0.15		-0.9	(-6.8, 4.9)	0.75	0.4	(-6.0, 6.9)	0.90
pa		0.5	(-0.1, 1.1)	0.12	0.1	(-0.4, 0.6)	0.70		**3.1**	**(1.0, 5.2)**	**0.01**	0.7	(-1.6, 3.0)	0.56
NO (ppm)		-2.9	(-23.4, 17.7)	0.78	12.0	(-3.3, 27.2)	0.12		-32.4	(-100.1, 35.4)	0.34	38.1	(-36.2, 112.3)	0.31
pa* NO		1.5	(-0.6, 3.5)	0.17	-1.4	(-2.9, 0.2)	0.08		-0.4	(-7.3, 6.4)	0.90	0.2	(-7.3, 7.7)	0.96
pa		0.5	(-0.1, 1.2)	0.11	0.1	(-0.4, 0.6)	0.75		**3.1**	**(0.9, 5.2)**	**0.01**	0.6	(-1.7, 2.9)	0.59
BC (10*µg/m^3)		-0.2	(-5.0, 4.5)	0.93	3.0	(-0.5, 6.6)	0.10		-6.4	(-22.1, 9.4)	0.42	9.8	(-7.4, 27.0)	0.26
pa * BC		0.4	(-0.1, 0.9)	0.11	-0.3	(-0.7, 0.1)	0.15		-0.5	(-2.1, 1.2)	0.58	-0.1	(-1.9, 1.7)	0.93
pa		0.50	(-0.1, 1.1)	0.12	0.10	(-0.4, 0.6)	0.72		**3.1**	**(1.0, 5.2)**	**0.01**	0.60	(-1.7, 2.9)	0.58
UFP (10^5*cm^{-3})		-0.10	(-1.0, 0.9)	0.85	0.50	(-0.2, 1.2)	0.16		-1.3	(-4.4, 1.8)	0.40	1.80	(-1.5, 5.2)	0.28
pa * UFP		0.07	(-0.029, 0.160)	0.17	-0.06	(-0.1, 0.0)	0.11		-0.019	(-0.3, 0.3)	0.91	-0.05	(-0.4, 0.3)	0.75
pa		0.50	(-0.1, 1.1)	0.12	0.10	(-0.4, 0.6)	0.69		**3.1**	**(1.0, 5.2)**	**0.004**	0.60	(-1.7, 2.9)	0.59
$PM_{2.5}$ (µg/m^3)		-0.05	(-0.3, 0.2)	0.73	0.20	(-0.049, 0.351)	0.14		-0.6	(-1.4, 0.3)	0.20	0.40	(-0.5, 1.4)	0.38
pa * $PM_{2.5}$		**0.02**	**(0.000, 0.047)**	**0.05**	-0.01	(-0.024, 0.011)	0.45		-0.032	(-0.1, 0.0)	0.41	0.00	(-0.1, 0.1)	0.91
pa		0.50	(-0.1, 1.1)	0.13	0.10	(-0.4, 0.6)	0.69		**3.2**	**(1.1, 5.2)**	**0.003**	0.60	(-1.7, 3.0)	0.59
PM_{10} (µg/m^3)		-0.05	(-0.2, 0.1)	0.54	0.05	(-0.1, 0.2)	0.46		-0.5	(-1.0, 0.0)	0.06	0.004	(-0.6, 0.6)	0.99
pa * PM_{10}		**0.02**	**(0.0, 0.0)**	**0.02**	0.00	(0.0, 0.0)	0.82		-0.01	(-0.1, 0.0)	0.63	0.01	(0.0, 0.1)	0.80
pa		0.50	(-0.2, 1.1)	0.15	0.10	(-0.4, 0.6)	0.67		**3.3**	**(1.2, 5.3)**	**0.002**	0.70	(-1.6, 3.0)	0.55
PM_{coarse} (µg/m^3)		-0.10	(-0.5, 0.2)	0.44	-0.10	(-0.3, 0.2)	0.64		**-1.3**	**(-2.4, -0.2)**	**0.02**	-0.80	(-2.0, 0.5)	0.23
pa * PM_{coarse}		**0.03**	**(0.004, 0.056)**	**0.02**	0.01	(-0.015, 0.026)	0.57		0.002	(-0.1, 0.1)	0.96	0.04	(-0.1, 0.1)	0.42
pa	FEV_1/FVC (%)	**0.033**	**(0.01, 0.06)**	**0.01**	0.006	(-0.02, 0.03)	0.67	FVC (mL)	2.10	(-0.3, 4.5)	0.09	0.50	(-1.7, 2.8)	0.64
NO_x (ppm)		-0.300	(-1.02, 0.34)	0.32	-0.045	(-0.82, 0.73)	0.91		-19.70	(-88.8, 49.3)	0.57	34.30	(-31.7, 100.3)	0.30
pa * NO_x		0.010	(-0.06, 0.08)	0.76	-0.023	(-0.10, 0.05)	0.55		-1.73	(-8.4, 5.0)	0.61	0.16	(-6.2, 6.6)	0.96
pa		**0.034**	**(0.01, 0.06)**	**0.01**	0.005	(-0.02, 0.03)	0.69		2.10	(-0.3, 4.5)	0.09	0.50	(-1.8, 2.8)	0.66
NO (ppm)		-0.500	(-1.24, 0.26)	0.20	-0.046	(-0.91, 0.82)	0.92		-8.10	(-85.3, 69.1)	0.84	38.10	(-35.6, 111.7)	0.31
pa* NO		0.023	(-0.05, 0.10)	0.54	-0.028	(-0.12, 0.06)	0.52		-1.92	(-9.7, 5.9)	0.63	-0.24	(-7.7, 7.2)	0.95
pa		**0.034**	**(0.01, 0.06)**	**0.005**	0.005	(-0.02, 0.03)	0.70		2.00	(-0.3, 4.4)	0.09	0.50	(-1.8, 2.8)	0.68
BC (10*µg/m^3)		-0.100	(-0.25, 0.10)	0.41	0.012	(-0.19, 0.21)	0.90		-2.70	(-20.6, 15.1)	0.76	8.30	(-8.8, 25.5)	0.34
pa * BC		0.005	(-0.01, 0.02)	0.60	-0.009	(-0.03, 0.01)	0.41		-0.83	(-2.7, 1.1)	0.39	-0.05	(-1.9, 1.8)	0.96
pa		**0.034**	**(0.01, 0.06)**	**0.01**	0.005	(-0.02, 0.03)	0.70		2.10	(-0.3, 4.5)	0.09	0.50	(-1.8, 2.8)	0.67
UFP (10^5*cm^{-3})		-0.021	(-0.06, 0.01)	0.22	-0.004	(-0.04, 0.04)	0.84		-0.20	(-3.7, 3.3)	0.90	1.90	(-1.4, 5.3)	0.25
pa * UFP		0.001	(-0.003, 0.004)	0.61	-0.002	(-0.006, 0.002)	0.31		-0.09	(-0.4, 0.3)	0.63	-0.05	(-0.4, 0.3)	0.78
pa		**0.034**	**(0.01, 0.06)**	**0.01**	0.006	(-0.02, 0.03)	0.67		2.10	(-0.3, 4.5)	0.08	0.50	(-1.8, 2.8)	0.68
$PM_{2.5}$ (µg/m^3)		-0.003	(-0.01, 0.01)	0.59	0.001	(-0.01, 0.01)	0.93		-0.40	(-1.4, 0.5)	0.38	0.40	(-0.6, 1.3)	0.43
pa * $PM_{2.5}$		0.000	(0.00, 0.00)	0.90	-0.001	(0.00, 0.00)	0.31		-0.04	(-0.1, 0.1)	0.41	0.004	(-0.1, 0.1)	0.93
pa		**0.034**	**(0.01, 0.06)**	**0.01**	0.006	(-0.02, 0.03)	0.64		2.20	(-0.1, 4.6)	0.07	0.50	(-1.8, 2.8)	0.68
PM_{10} (µg/m^3)		-0.0003	(-0.01, 0.01)	0.92	0.000	(-0.01, 0.01)	1.00		-0.50	(-1.1, 0.1)	0.07	-0.05	(-0.6, 0.5)	0.88
pa * PM_{10}		-0.00001	(-0.0005, 0.0005)	0.967	0.000	(0.00, 0.00)	0.26		0.00	(-0.05, 0.05)	0.92	0.02	(0.0, 0.1)	0.43
pa		**0.033**	**(0.01, 0.06)**	**0.01**	0.007	(-0.02, 0.03)	0.62		**2.30**	**(0.02, 4.61)**	**0.05**	0.50	(-1.7, 2.8)	0.65
PM_{coarse} (µg/m^3)		0.004	(-0.01, 0.02)	0.51	-0.001	(-0.01, 0.01)	0.94		**-1.80**	**(-3.01, -0.54)**	**0.01**	-0.90	(-2.2, 0.3)	0.13
pa * PM_{coarse}		-0.0002	(-0.001, 0.001)	0.71	-0.001	(-0.002, 0.001)	0.30		0.04	(-0.1, 0.1)	0.37	0.08	(-0.01, 0.17)	0.10
pa	$FEF_{25-75\%}$ (mL/s)	**5.70**	**(1.3, 10.2)**	**0.01**	1.60	(-4.2, 7.5)	0.58							
NO_x (ppm)		-30.3	(-159.2, 98.5)	0.64	-10.10	(-179.6, 159.4)	0.91							
pa * NO_x		0.24	(-12.3, 12.8)	0.97	-0.25	(-16.7, 16.2)	0.98							
pa		**5.80**	**(1.3, 10.2)**	**0.01**	1.70	(-4.2, 7.5)	0.58							
NO (ppm)		-36.0	(-179.8, 107.9)	0.62	-1.80	(-191.2, 187.5)	0.99							
pa* NO		1.26	(-13.3, 15.8)	0.86	-0.68	(-19.9, 18.5)	0.94							
pa		**5.80**	**(1.3, 10.3)**	**0.01**	1.60	(-4.2, 7.5)	0.58							
BC (10*µg/m^3)		-1.80	(-35.3, 31.6)	0.91	4.20	(-39.7, 48.1)	0.85							
pa * BC		0.09	(-3.5, 3.6)	0.96	-0.21	(-4.9, 4.4)	0.93							
pa		**5.80**	**(1.3, 10.3)**	**0.01**	1.60	(-4.3, 7.5)	0.59							
UFP (10^5*cm^{-3})		-1.40	(-7.9, 5.2)	0.68	-0.10	(-8.7, 8.6)	0.99							
pa * UFP		0.07	(-0.6, 0.7)	0.83	-0.15	(-1.0, 0.7)	0.73							
pa		**5.80**	**(1.3, 10.3)**	**0.01**	1.70	(-4.2, 7.5)	0.58							
$PM_{2.5}$ (µg/m^3)		-0.30	(-2.1, 1.6)	0.76	0.01	(-2.4, 2.4)	0.99							
pa * $PM_{2.5}$		-0.02	(-0.2, 0.1)	0.85	-0.01	(-0.2, 0.2)	0.90							
pa		**5.80**	**(1.4, 10.3)**	**0.01**	1.70	(-4.1, 7.6)	0.56							
PM_{10} (µg/m^3)		-0.20	(-1.4, 0.9)	0.66	-0.30	(-1.8, 1.1)	0.65							
pa * PM_{10}		0.00	(-0.1, 0.1)	1.00	-0.01	(-0.1, 0.1)	0.90							
pa		**5.90**	**(1.4, 10.3)**	**0.01**	1.90	(-4.0, 7.7)	0.53							
PM_{coarse} (µg/m^3)		-0.60	(-3.0, 1.8)	0.62	-1.50	(-4.7, 1.6)	0.34							
pa * PM_{coarse}		0.02	(-0.2, 0.2)	0.87	0.005	(-0.2, 0.2)	0.97							

Abbreviations: BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV_1, Forced expiratory volume in 1 s; FVC, Forced viatal capacity; pa, continous covariate for physical activity; p, p-value ; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models.

Interaction model IA2

Table S25: Interaction model IA2 with continous variables testing for interaction between physical activity and NO_2 pre-exposure

		Time Point 1			Time Point 2				Time Point 1			Time Point 2		
Estimate		**Coeff.**	**95% CI**	**p**	**Coeff.**	**95% CI**	**p**		**Coeff.**	**95% CI**	**p**	**Coeff.**	**95% CI**	**p**
pa	PEF (L/min)	0.48	(-0.17, 1.13)	0.14	0.1	(-0.35, 0.62)	0.57	FEV1 (mL)	**2.94**	**(0.85, 5.03)**	**0.01**	0.7	(-1.58, 3.05)	0.53
NO_2 pre-exp. (ppm)		0.16	(-0.17, 0.49)	0.34	0.1	(-0.16, 0.35)	0.47		0.43	(-0.70, 1.56)	0.45	0.3	(-0.98, 1.51)	0.68
NO_x (ppm)		-5.06	(-23.41, 13.29)	0.59	13.3	(-0.35, 26.95)	0.06		-31.32	(-90.35, 27.71)	0.29	33.6	(-31.72, 98.84)	0.31
pa * NO_2 pre-exp.		0.00	(-0.02, 0.02)	0.90	0.0	(-0.01, 0.02)	0.67		-0.04	(-0.11, 0.03)	0.29	0.01	(-0.07, 0.10)	0.76
pa		0.49	(-0.16, 1.13)	0.14	0.1	(-0.35, 0.61)	0.60		**2.96**	**(0.86, 5.05)**	**0.01**	0.7	(-1.59, 3.03)	0.54
NO_2 pre-exp. (ppm)		0.16	(-0.18, 0.49)	0.35	0.1	(-0.16, 0.35)	0.47		0.43	(-0.70, 1.56)	0.45	0.3	(-0.98, 1.51)	0.68
NO (ppm)		-5.38	(-25.97, 15.20)	0.60	14.1	(-1.25, 29.43)	0.07		-29.5	(-95.79, 36.83)	0.38	37.0	(-36.19, 110.21)	0.32
pa * NO_2 pre-exp.		0.00	(-0.02, 0.02)	0.92	0.0	(-0.01, 0.02)	0.61		-0.04	(-0.12, 0.03)	0.263	0.01	(-0.07, 0.10)	0.72
pa		0.49	(-0.16, 1.14)	0.14	0.1	(-0.37, 0.60)	0.63		**2.99**	**(0.89, 5.09)**	**0.01**	0.7	(-1.63, 2.99)	0.56
NO_2 pre-exp. (ppm)		0.17	(-0.17, 0.50)	0.32	0.1	(-0.19, 0.32)	0.62		0.49	(-0.65, 1.62)	0.40	0.2	(-1.07, 1.42)	0.78
BC (10*µg/m^3)		-0.58	(-5.41, 4.26)	0.81	3.2	(-0.39, 6.81)	0.08		-5.48	(-21.06, 10.11)	0.49	9.7	(-7.49, 26.80)	0.27
pa * NO_2 pre-exp.		0.00	(-0.02, 0.02)	0.93	0.0	(-0.01, 0.02)	0.61		-0.04	(-0.12, 0.03)	0.26	0.01	(-0.07, 0.10)	0.73
pa		0.49	(-0.16, 1.14)	0.14	0.12	(-0.36, 0.61)	0.61		**2.97**	**(0.88, 5.07)**	**0.01**	0.70	(-1.60, 3.01)	0.55
NO_2 pre-exp. (ppm)		0.17	(-0.17, 0.50)	0.33	0.08	(-0.18, 0.33)	0.56		0.47	(-0.66, 1.60)	0.41	0.21	(-1.03, 1.45)	0.74
UFP (10^5*cm^{-3})		-0.19	(-1.13, 0.75)	0.69	0.58	(-0.12, 1.29)	0.10		-1.19	(-4.22, 1.84)	0.44	1.88	(-1.46, 5.22)	0.27
pa * NO_2 pre-exp.		0.001	(-0.02, 0.02)	0.92	0.00	(-0.01, 0.02)	0.60		-0.04	(-0.12, 0.03)	0.26	0.01	(-0.07, 0.10)	0.73
pa		0.492	(-0.16, 1.14)	0.14	0.11	(-0.37, 0.60)	0.65		**3.00**	**(0.91, 5.09)**	**0.01**	0.67	(-1.64, 2.99)	0.56
NO_2 pree. (ppm)		0.186	(-0.16, 0.53)	0.29	0.02	(-0.25, 0.29)	0.87		0.66	(-0.52, 1.83)	0.27	0.07	(-1.23, 1.37)	0.92
$PM_{2.5}$ (µg/m^3)		-0.058	(-0.33, 0.21)	0.67	0.15	(-0.05, 0.35)	0.14		-0.50	(-1.37, 0.36)	0.25	0.41	(-0.54, 1.37)	0.39
pa * NO_2 pre-exp.		0.001	(-0.02, 0.02)	0.91	0.00	(-0.01, 0.02)	0.64		-0.04	(-0.11, 0.03)	0.29	0.01	(-0.07, 0.10)	0.75
pa		0.50	(-0.15, 1.15)	0.13	0.11	(-0.38, 0.60)	0.66		**3.08**	**(1.01, 5.14)**	**0.004**	0.69	(-1.64, 3.02)	0.56
NO_2 pre-exp. (ppm)		0.20	(-0.16, 0.56)	0.27	0.05	(-0.23, 0.33)	0.74		0.86	(-0.34, 2.05)	0.16	0.24	(-1.11, 1.58)	0.73
PM_{10} (µg/m^3)		-0.05	(-0.21, 0.12)	0.56	0.04	(-0.08, 0.17)	0.51		-0.47	(-0.99, 0.05)	0.08	-0.01	(-0.60, 0.58)	0.97
pa * NO_2 pre-exp.		0.00	(-0.02, 0.03)	0.88	0.00	(-0.01, 0.02)	0.61		-0.04	(-0.11, 0.04)	0.35	0.02	(-0.07, 0.10)	0.68
pa		0.50	(-0.15, 1.16)	0.13	0.13	(-0.37, 0.63)	0.60		**3.18**	**(1.13, 5.24)**	**0.003**	0.81	(-1.50, 3.13)	0.49
NO_2 pre-exp. (ppm)		0.20	(-0.16, 0.57)	0.27	0.11	(-0.17, 0.39)	0.45		1.00	(-0.20, 2.21)	0.10	0.56	(-0.79, 1.92)	0.41
PM_{coarse} (µg/m^3)		-0.09	(-0.44, 0.25)	0.59	-0.07	(-0.33, 0.20)	0.61		**-1.23**	**(-2.34, -0.12)**	**0.03**	-0.77	(-2.01, 0.48)	0.23
pa * NO_2 pre-exp.		0.002	(-0.02, 0.03)	0.87	0.01	(-0.01, 0.02)	0.50		-0.03	(-0.10, 0.04)	0.40	0.03	(-0.06, 0.11)	0.55
pa		**0.0313**	**(0.01, 0.05)**	**0.01**	0.0050	(-0.02, 0.03)	0.71		2.065	(-0.34, 4.47)	0.09	0.651	(-1.63, 2.94)	0.57
NO_2 pre-exp. (ppm)		-0.0002	(-0.01, 0.01)	0.97	0.0030	(-0.01, 0.02)	0.68		0.729	(-0.57, 2.03)	0.27	0.278	(-0.95, 1.51)	0.66
NO_x (ppm)		-0.3048	(-0.96, 0.35)	0.36	0.0339	(-0.72, 0.79)	0.93		-15.032	(-82.96, 52.90)	0.66	30.598	(-33.85, 95.05)	0.35
pa * NO_2 pre-exp.		-0.0007	(-0.002, 0.0001)	0.09	-0.0004	(-0.001, 0.0006)	0.42		-0.013	(-0.10, 0.07)	0.76	0.043	(-0.04, 0.12)	0.30
pa		**0.0313**	**(0.01, 0.05)**	**0.01**	0.0050	(-0.022, 0.032)	0.71		2.083	(-0.33, 4.49)	0.09	0.636	(-1.65, 2.92)	0.58
NO_2 pre-exp. (ppm)		-0.0004	(-0.01, 0.01)	0.95	0.0030	(-0.011, 0.017)	0.68		0.740	(-0.56, 2.04)	0.26	0.282	(-0.95, 1.51)	0.65
NO (ppm)		-0.4922	(-1.22, 0.24)	0.18	0.0222	(-0.828, 0.872)	0.96		-4.075	(-80.31, 72.16)	0.92	36.191	(-36.02, 108.40)	0.32
pa * NO_2 pre-exp.		-0.0007	(0.00, 0.00)	0.08	-0.0004	(-0.001, 0.001)	0.42		-0.015	(-0.10, 0.07)	0.73	0.044	(-0.04, 0.13)	0.28
pa		**0.0318**	**(0.01, 0.05)**	**0.01**	0.0049	(-0.022, 0.032)	0.72		2.088	(-0.32, 4.50)	0.09	0.602	(-1.68, 2.89)	0.60
NO_2 pre-exp. (ppm)		0.0005	(-0.01, 0.01)	0.94	0.0029	(-0.012, 0.017)	0.69		0.753	(-0.55, 2.05)	0.25	0.207	(-1.03, 1.44)	0.74
BC (10*µg/m^3)		-0.0697	(-0.24, 0.10)	0.42	0.0242	(-0.175, 0.224)	0.81		-1.881	(-19.76, 16.00)	0.84	7.888	(-9.07, 24.84)	0.36
pa * NO_2 pre-exp.		-0.0007	(-0.002, 0.0001)	0.08	-0.0004	(-0.001, 0.001)	0.42		-0.015	(-0.10, 0.07)	0.73	0.045	(-0.04, 0.13)	0.28
pa	FEV1/FVC (%)	**0.0315**	**(0.008, 0.055)**	**0.01**	0.0049	(-0.022, 0.032)	0.72	FVC (mL)	2.086	(-0.32, 4.50)	0.09	0.623	(-1.65, 2.90)	0.59
NO_2 pre-exp. (ppm)		0.0003	(-0.01, 0.01)	0.97	0.0030	(-0.011, 0.017)	0.68		0.744	(-0.55, 2.04)	0.26	0.231	(-1.00, 1.46)	0.71
UFP (10^5*cm^{-3})		-0.021	(-0.05, 0.01)	0.21	-0.0001	(-0.039, 0.039)	1.00		-0.051	(-3.53, 3.43)	0.98	1.922	(-1.37, 5.21)	0.25
pa * NO_2 pre-exp.		-0.0007	(-0.002, 0.0001)	0.08	-0.0004	(-0.001, 0.001)	0.42		-0.015	(-0.10, 0.07)	0.73	0.044	(-0.04, 0.12)	0.29
pa		**0.0318**	**(0.008, 0.055)**	**0.01**	0.0049	(-0.022, 0.032)	0.72		2.102	(-0.30, 4.50)	0.09	0.595	(-1.69, 2.88)	0.61
NO_2 pree. (ppm)		0.0008	(-0.012, 0.014)	0.90	0.0025	(-0.012, 0.017)	0.74		0.906	(-0.44, 2.26)	0.19	0.117	(-1.17, 1.41)	0.86
$PM_{2.5}$ (µg/m^3)		-0.0018	(-0.011, 0.008)	0.71	0.0012	(-0.010, 0.012)	0.83		-0.409	(-1.40, 0.58)	0.42	0.329	(-0.62, 1.28)	0.49
pa * NO_2 pre-exp.		-0.0007	(-0.002, 0.0001)	0.08	-0.0004	(-0.001, 0.001)	0.41		-0.012	(-0.10, 0.07)	0.79	0.044	(-0.04, 0.13)	0.29
pa		**0.0316**	**(0.01, 0.05)**	**0.01**	0.0049	(-0.022, 0.032)	0.72		2.194	(-0.17, 4.56)	0.07	0.625	(-1.67, 2.92)	0.59
NO_2 pre-exp. (ppm)		-0.0003	(-0.01, 0.01)	0.97	0.0027	(-0.013, 0.018)	0.73		1.203	(-0.17, 2.57)	0.08	0.322	(-1.01, 1.65)	0.63
PM_{10} (µg/m^3)		0.0004	(-0.01, 0.01)	0.88	0.0003	(-0.006, 0.007)	0.92		-0.535	(-1.13, 0.06)	0.08	-0.088	(-0.67, 0.49)	0.76
pa * NO_2 pre-exp.		-0.0008	(-0.002, 0.0001)	0.07	-0.0004	(-0.001, 0.001)	0.42		-0.005	(-0.09, 0.08)	0.91	0.048	(-0.03, 0.13)	0.25
pa		**0.0308**	**(0.01, 0.05)**	**0.01**	0.0050	(-0.022, 0.032)	0.71		**2.368**	**(0.06, 4.68)**	**0.05**	0.765	(-1.50, 3.03)	0.50
NO_2 pre-exp. (ppm)		-0.0025	(-0.02, 0.01)	0.72	0.0032	(-0.012, 0.019)	0.69		**1.517**	**(0.16, 2.88)**	**0.03**	0.676	(-0.66, 2.01)	0.32
PM_{coarse} (µg/m^3)		0.0059	(-0.01, 0.02)	0.35	-0.0005	(-0.015, 0.014)	0.95		**-1.721**	**(-2.97, -0.47)**	**0.01**	-0.965	(-2.19, 0.26)	0.12
pa * NO_2 pre-exp.		-0.0008	(0.00, 0.00)	0.05	-0.0004	(-0.001, 0.001)	0.43		0.003	(-0.08, 0.09)	0.95	0.057	(-0.02, 0.14)	0.17
pa	$FEF_{25-75\%}$ (mL/s)	**5.57**	**(1.10, 10.04)**	**0.02**	1.70	(-4.21, 7.60)	0.57							
NO_2 pre-exp. (ppm)		0.26	(-2.13, 2.65)	0.83	0.74	(-2.40, 3.88)	0.64							
NO_x (ppm)		-25.95	(-152.17, 100.26	0.68	-10.94	(-177.56, 155.68)	0.90							
pa * NO_2 pre-exp.		-0.06	(-0.22, 0.10)	0.44	0.02	(-0.19, 0.23)	0.87							
pa		**5.58**	**(1.11, 10.05)**	**0.02**	1.71	(-4.19, 7.61)	0.57							
NO_2 pre-exp. (ppm)		0.25	(-2.14, 2.64)	0.83	0.75	(-2.39, 3.89)	0.64							
NO (ppm)		-34.84	(-176.28, 106.61	0.63	-1.52	(-188.35, 185.32)	0.99							
pa * NO_2 pre-exp.		-0.06	(-0.22, 0.10)	0.43	0.02	(-0.19, 0.23)	0.88							
pa		**5.61**	**(1.13, 10.08)**	**0.02**	1.71	(-4.19, 7.61)	0.57							
NO_2 pre-exp. (ppm)		0.29	(-2.11, 2.69)	0.81	0.73	(-2.41, 3.87)	0.65							
BC (10*µg/m^3)		-1.18	(-34.41, 32.06)	0.94	4.21	(-39.61, 48.03)	0.85							
pa * NO_2 pre-exp.		-0.07	(-0.22, 0.09)	0.41	0.02	(-0.19, 0.22)	0.89							
pa		**5.60**	**(1.13, 10.06)**	**0.02**	1.71	(-4.19, 7.61)	0.57							
NO_2 pre-exp. (ppm)		0.30	(-2.09, 2.69)	0.81	0.75	(-2.38, 3.89)	0.64							
UFP (10^5*cm^{-3})		-1.35	(-7.81, 5.12)	0.68	0.14	(-8.40, 8.68)	0.97							
pa * NO_2 pre-exp.		-0.06	(-0.22, 0.09)	0.42	0.02	(-0.19, 0.23)	0.88							
pa		**5.61**	**(1.14, 10.09)**	**0.02**	1.71	(-4.19, 7.61)	0.57							
NO_2 pree. (ppm)		0.37	(-2.13, 2.86)	0.77	0.75	(-2.52, 4.02)	0.65							
$PM_{2.5}$ (µg/m^3)		-0.21	(-2.06, 1.64)	0.82	0.00	(-2.44, 2.44)	1.00							
pa * NO_2 pre-exp.		-0.06	(-0.22, 0.10)	0.43	0.02	(-0.19, 0.23)	0.88							
pa		**5.64**	**(1.17, 10.12)**	**0.01**	1.78	(-4.12, 7.68)	0.55							
NO_2 pre-exp. (ppm)		0.44	(-2.13, 3.01)	0.73	1.05	(-2.32, 4.41)	0.54							
PM_{10} (µg/m^3)		-0.19	(-1.32, 0.94)	0.74	-0.36	(-1.85, 1.13)	0.63							
pa * NO_2 pre-exp.		-0.06	(-0.22, 0.10)	0.44	0.02	(-0.19, 0.23)	0.83							
pa		**5.68**	**(1.19, 10.17)**	**0.01**	1.97	(-3.92, 7.86)	0.51							
NO_2 pre-exp. (ppm)		0.48	(-2.13, 3.09)	0.72	1.43	(-1.97, 4.83)	0.41							
PM_{coarse} (µg/m^3)		-0.44	(-2.86, 1.98)	0.72	-1.58	(-4.75, 1.59)	0.32							
pa * NO_2 pre-exp.		-0.06	(-0.22, 0.10)	0.45	0.03	(-0.18, 0.24)	0.76							

Abbreviations: BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV_1, Forced expiratory volume in 1 s; FVC, Forced viatal capacity; pa, continous covariate for physical activity; p, p-value ; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models.

Interaction model IA3

Table S26: Interaction model IA3 with continous variables testing for interaction between pre-exposure and single pollutants

		Time Point 1			Time Point 2				Time Point 1			Time Point 2		
Estimate		Coeff.	95% CI	p	Coeff.	95% CI	p		Coeff.	95% CI	p	Coeff.	95% CI	p
pa	PEF (L/min)	0.4	(-0.198, 1.091)	0.17	0.14	(-0.342, 0.623)	0.56	FEV1 (mL)	**3.0**	**(0.914, 5.126)**	**0.01**	0.7	(-1.614, 3.014)	0.55
NO_x (ppm)		-1.2	(-20.68, 18.37)	0.91	12.03	(-2.57, 26.64)	0.11		-31.7	(-95.40, 31.95)	0.32	35.1	(-34.81, 105.11)	0.32
NO_2 pre. * NO_x		0.4	(-0.38, 1.24)	0.30	-0.17	(-0.78, 0.43)	0.57		0.3	(-2.34, 2.96)	0.82	0.1	(-2.84, 2.98)	0.96
pa		0.5	(-0.179, 1.108)	0.16	0.13	(-0.354, 0.609)	0.60		**3.1**	**(0.952, 5.162)**	**0.01**	0.7	(-1.617, 2.997)	0.55
NO (ppm)		-0.3	(-23.29, 22.76)	0.98	11.33	(-5.88, 28.55)	0.19		-26.7	(-101.84, 48.43)	0.48	34.5	(-47.82, 116.91)	0.41
NO_2 pre. * NO		0.5	(-0.52, 1.46)	0.34	-0.28	(-1.02, 0.46)	0.46		0.5	(-2.77, 3.70)	0.78	-0.3	(-3.85, 3.25)	0.87
pa		0.5	(-0.157, 1.122)	0.14	0.11	(-0.369, 0.583)	0.66		**3.1**	**(0.997, 5.194)**	**0.004**	0.6	(-1.644, 2.943)	0.57
BC (10*µg/m³)		0.5	(-4.55, 5.46)	0.86	2.41	(-1.31, 6.13)	0.20		-4.1	(-20.45, 12.31)	0.62	8.1	(-9.81, 25.99)	0.37
NO_2 pre. * BC		0.2	(-0.07, 0.37)	0.18	-0.13	(-0.29, 0.04)	0.13		0.3	(-0.45, 1.01)	0.44	-0.3	(-1.06, 0.54)	0.52
pa		0.47	(-0.171, 1.116)	0.15	0.12	(-0.363, 0.602)	0.62		**3.08**	**(0.978, 5.191)**	**0.01**	0.70	(-1.601, 2.991)	0.55
UFP (10^5*cm^{-3})		0.00	(-1.02, 1.02)	0.99	0.46	(-0.31, 1.22)	0.24		-1.23	(-4.56, 2.10)	0.46	1.43	(-2.20, 5.07)	0.44
NO_2 pre. * UFP		0.02	(-0.02, 0.06)	0.37	-0.01	(-0.05, 0.02)	0.38		0.01	(-0.13, 0.14)	0.94	-0.05	(-0.20, 0.10)	0.51
pa		0.48	(-0.156, 1.113)	0.14	0.11	(-0.373, 0.586)	0.66		**3.11**	**(1.019, 5.205)**	**0.004**	0.65	(-1.652, 2.949)	0.58
$PM_{2.5}$ (µg/m³)		-0.03	(-0.30, 0.23)	0.81	0.14	(-0.06, 0.34)	0.17		-0.55	(-1.42, 0.32)	0.21	0.40	(-0.56, 1.35)	0.41
NO_2 pre. * $PM_{2.5}$		0.01	(0.00, 0.02)	0.08	-0.01	(-0.01, 0.00)	0.16		-0.001	(-0.03, 0.03)	0.95	-0.01	(-0.05, 0.02)	0.55
pa		0.49	(-0.121, 1.111)	0.11	0.10	(-0.388, 0.579)	0.70		**3.18**	**(1.112, 5.246)**	**0.003**	0.64	(-1.666, 2.945)	0.58
PM_{10} (µg/m³)		-0.03	(-0.19, 0.12)	0.67	0.04	(-0.08, 0.16)	0.51		-0.50	(-1.02, 0.02)	0.06	-0.01	(-0.59, 0.57)	0.97
NO_2 pre. * PM_{10}		**0.01**	**(0.00, 0.01)**	**0.01**	-0.003	(-0.01, 0.00)	0.11		0.00	(-0.01, 0.02)	0.69	-0.01	(-0.03, 0.01)	0.37
pa		0.53	(-0.086, 1.143)	0.09	0.10	(-0.389, 0.592)	0.68		**3.32**	**(1.277, 5.357)**	**0.002**	0.71	(-1.587, 3.012)	0.54
PM_{coarse} (µg/m³)		-0.14	(-0.47, 0.19)	0.39	-0.04	(-0.30, 0.23)	0.79		**-1.37**	**(-2.47, -0.27)**	**0.02**	-0.66	(-1.90, 0.58)	0.29
NO_2 pre. * PM_{coarse}		**0.01**	**(0.00, 0.02)**	**0.004**	-0.004	(-0.01, 0.00)	0.25		0.02	(-0.01, 0.05)	0.29	-0.01	(-0.05, 0.02)	0.52
pa	FEV_1/FVC (%)	**0.0312**	**(0.008, 0.054)**	**0.01**	0.0052	(-0.022, 0.032)	0.70	FVC (mL)	2.17	(-0.238, 4.571)	0.08	0.593	(-1.702, 2.889)	0.61
NO_x (ppm)		-0.1130	(-0.81, 0.58)	0.75	0.1075	(-0.705, 0.920)	0.79		-24.60	(-97.29, 48.09)	0.50	27.371	(-42.02, 96.77)	0.44
NO_2 pre. * NO_x		0.0279	(-0.001, 0.057)	0.06	0.0117	(-0.022, 0.045)	0.49		-0.96	(-3.98, 2.07)	0.53	-0.738	(-3.63, 2.15)	0.61
pa		**0.0322**	**(0.009, 0.055)**	**0.01**	0.0056	(-0.021, 0.032)	0.68		2.16	(-0.241, 4.559)	0.08	0.564	(-1.720, 2.847)	0.63
NO (ppm)		-0.1752	(-0.994, 0.643)	0.67	0.1351	(-0.822, 1.093)	0.78		-16.39	(-102.06, 69.28)	0.70	23.986	(-57.52, 105.49)	0.56
NO_2 pre. * NO		0.0331	(-0.002, 0.068)	0.07	0.0124	(-0.029, 0.054)	0.55		-1.08	(-4.77, 2.61)	0.56	-1.353	(-4.86, 2.16)	0.45
pa		**0.0335**	**(0.011, 0.056)**	**0.004**	0.0060	(-0.021, 0.033)	0.66		2.13	(-0.262, 4.528)	0.08	0.493	(-1.777, 2.762)	0.67
BC (10*µg/m³)		-0.0008	(-0.175, 0.173)	0.99	0.0297	(-0.179, 0.239)	0.78		-3.49	(-22.19, 15.20)	0.71	5.304	(-12.41, 23.01)	0.55
NO_2 pre. * BC		**0.0116**	**(0.004, 0.019)**	**0.004**	0.0015	(-0.008, 0.011)	0.75		-0.22	(-1.05, 0.62)	0.61	-0.461	(-1.25, 0.33)	0.25
pa		**0.0326**	**(0.010, 0.055)**	**0.01**	0.0057	(-0.021, 0.033)	0.67		2.17	(-0.225, 4.559)	0.08	0.563	(-1.698, 2.823)	0.62
UFP (10^5*cm^{-3})		-0.0073	(-0.043, 0.029)	0.69	0.0031	(-0.039, 0.046)	0.89		-0.74	(-4.53, 3.04)	0.70	1.071	(-2.50, 4.65)	0.55
NO_2 pre. * UFP		**0.0016**	**(0.000, 0.003)**	**0.04**	0.0004	(-0.001, 0.002)	0.63		-0.07	(-0.22, 0.09)	0.39	-0.098	(-0.25, 0.05)	0.19
pa		**0.0334**	**(0.011, 0.056)**	**0.01**	0.0058	(-0.021, 0.033)	0.67		2.16	(-0.208, 4.522)	0.07	0.500	(-1.767, 2.768)	0.66
$PM_{2.5}$ (µg/m³)		-0.0015	(-0.011, 0.008)	0.76	0.0012	(-0.010, 0.012)	0.84		-0.49	(-1.47, 0.50)	0.33	0.310	(-0.63, 1.25)	0.52
NO_2 pre. * $PM_{2.5}$		**0.0004**	**(0.000, 0.001)**	**0.03**	0.0001	(0.000, 0.001)	0.48		-0.02	(-0.06, 0.01)	0.24	-0.022	(-0.06, 0.01)	0.20
pa		**0.0339**	**(0.011, 0.057)**	**0.004**	0.0060	(-0.021, 0.033)	0.66		2.21	(-0.136, 4.548)	0.07	0.483	(-1.782, 2.749)	0.67
PM_{10} (µg/m³)		0.0001	(-0.006, 0.006)	0.96	0.0001	(-0.007, 0.007)	0.99		-0.55	(-1.14, 0.04)	0.07	-0.071	(-0.64, 0.50)	0.81
NO_2 pre. * PM_{10}		**0.0002**	**(0.000, 0.000)**	**0.02**	0.0001	(0.000, 0.000)	0.66		-0.01	(-0.03, 0.01)	0.50	-0.015	(-0.03, 0.00)	0.13
pa		**0.0339**	**(0.011, 0.057)**	**0.01**	0.0062	(-0.021, 0.033)	0.65		**2.38**	**(0.077, 4.673)**	**0.04**	0.555	(-1.710, 2.821)	0.63
PM_{coarse} (µg/m³)		0.0029	(-0.010, 0.015)	0.65	-0.0015	(-0.016, 0.013)	0.84		**-1.74**	**(-2.98, -0.50)**	**0.01**	-0.769	(-1.99, 0.45)	0.21
NO_2 pre. * PM_{coarse}		0.0003	(0.000, 0.001)	0.11	0.00003	(0.000, 0.000)	0.88		0.01	(-0.03, 0.04)	0.69	-0.017	(-0.05, 0.02)	0.33
pa	$FEF_{25-75\%}$ (mL/s)	**5.43**	**(1.010, 9.850)**	**0.02**	1.44	(-4.438, 7.313)	0.63							
NO_x (ppm)		6.80	(-126.86, 140.46)	0.92	16.86	(-160.84, 194.56)	0.85							
NO_2 pre. * NO_x		4.24	(-1.32, 9.80)	0.13	2.97	(-4.41, 10.36)	0.43							
pa		**5.57**	**(1.167, 9.972)**	**0.01**	1.55	(-4.308, 7.414)	0.60							
NO (ppm)		18.46	(-138.75, 175.67)	0.82	34.90	(-174.47, 244.26)	0.74							
NO_2 pre. * NO		5.29	(-1.47, 12.06)	0.12	3.33	(-5.68, 12.34)	0.46							
pa		**5.75**	**(1.371, 10.124)**	**0.01**	1.66	(-4.206, 7.526)	0.58							
BC (10*µg/m³)		7.44	(-26.72, 41.61)	0.67	6.37	(-39.45, 52.18)	0.78							
NO_2 pre. * BC		1.40	(-0.12, 2.92)	0.07	0.30	(-1.74, 2.34)	0.77							
pa		**5.63**	**(1.232, 10.028)**	**0.01**	1.62	(-4.246, 7.495)	0.58							
UFP (10^5*cm^{-3})		0.73	(-6.23, 7.69)	0.84	0.90	(-8.39, 10.20)	0.85							
NO_2 pre. * UFP		0.23	(-0.06, 0.52)	0.12	0.07	(-0.31, 0.46)	0.70							
pa		**5.75**	**(1.314, 10.195)**	**0.01**	1.65	(-4.214, 7.519)	0.58							
$PM_{2.5}$ (µg/m³)		-0.18	(-2.03, 1.67)	0.85	0.06	(-2.38, 2.50)	0.96							
NO_2 pre. * $PM_{2.5}$		0.03	(-0.03, 0.10)	0.33	0.01	(-0.07, 0.10)	0.76							
pa		**5.83**	**(1.371, 10.285)**	**0.01**	1.71	(-4.154, 7.583)	0.56							
PM_{10} (µg/m³)		-0.23	(-1.35, 0.90)	0.69	-0.34	(-1.82, 1.14)	0.65							
NO_2 pre. * PM_{10}		0.01	(-0.03, 0.05)	0.52	-0.004	(-0.05, 0.05)	0.89							
pa		**5.88**	**(1.404, 10.363)**	**0.01**	1.83	(-4.025, 7.690)	0.54							
PM_{coarse} (µg/m³)		-0.62	(-3.03, 1.79)	0.61	-1.45	(-4.59, 1.70)	0.36							
NO_2 pre. * PM_{coarse}		0.01	(-0.06, 0.07)	0.84	-0.01	(-0.10, 0.07)	0.74							

Abbreviations: BC, black coarse; $FEF_{25-75\%}$, Mean forced expiratory flow between 25% and 75% of FVC; FEV_1, Forced expiratory volume in 1 s; FVC, Forced viatal capacity; pa, continous covariate for physical activity; p, p-value ; PEF, Peak expiratory flow; PM, particulate matter; UFP ultrafine particles; 95% CI, Approximated 95% confidence interval for mixed-effects models.

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